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skin diver
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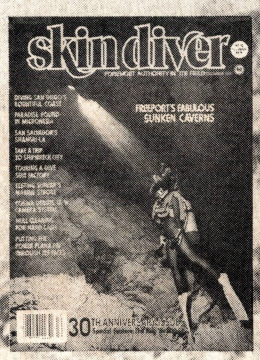

COVER

Jeanette Holmes pauses in the Skylight Room of the Lucayan Burial Mound, Grand Bahama Island. Rick Frehsee used a Nikonos III, with a 15 mm lens and two Ikelite Substrobe 150L's.

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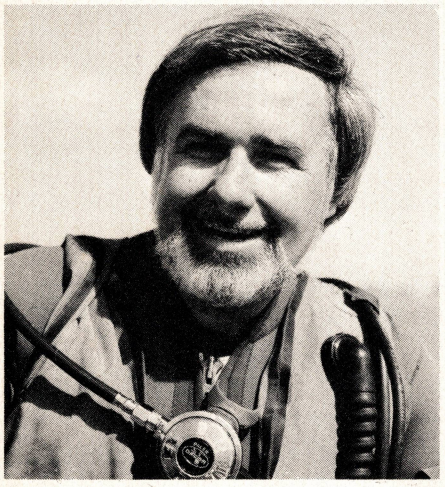
SDM Editorial

BY THE PUBLISHER



30 YEARS OF SERVICE — 30 YEARS OF SUCCESS

This month marks SKIN DIVER's 30th anniversary. The first issue was published in December 1951, almost at the point when organized sport diving began in the United States. Since then, the magazine has been published year after year, without ever missing a deadline. It has grown with the sport and kept pace with the industry, serving as the public voice for both.

And, during these three decades, the magazine has established a rather impressive string of accomplishments. For example, SKIN DIVER is now the oldest dive magazine in the entire world. No other has stayed in business so long or printed so much. SKIN DIVER is also the largest magazine in the dive world, printing and distributing over one-quarter million copies monthly. The next largest dive publication does not even come within 20 percent of SKIN DIVER's audience. SKIN DIVER is the best read publication on the international dive scene with sales and distribution in more than 105 countries around the world.

During the last 30 years SKIN DIVER has watched more than 50 other dive magazines come and go. The graveyard is filled with such familiar titles as: Water World, Underwater, Dive, Fathom, Aquarius, Diving World, Florida Diver, Diver Below and Sport Diver. Some published only one or two issues while others struggled for two or three years, but none has ever come close to matching the success and growth of SKIN DIVER.

Why has SKIN DIVER survived when all others have failed? This is not an easy question to answer because the formula for success is complex and elusive.

First of all, publishing is perhaps one of the most costly and most difficult enterprises in America today. The spiraling costs of paper, printing, postage and production make it almost prohibitive to launch a new magazine. SKIN DIVER began in an era when this was much easier. Since then, it has grown along with its market, developing a solid base of readers.

Secondly, SKIN DIVER has consistently delivered the kind of information its readers desire. While changing and evolving along with trends in the sport, it has maintained a philosophy and style that are as solid as the Rock of Gibraltar. And, readers have come to depend upon the steady flow of information that arrives with each successive issue.

It is tempting for any publisher to think that the success of his magazine is owing to clever management or wise foresight. In the case of SKIN DIVER this is not so. This publisher knows full well that SKIN DIVER is a team effort. Its success is owing to a group of hard working, highly talented people who put a small part of their souls into every issue.

The SKIN DIVER editorial staff, like the magazine, is a small cadre of seasoned veterans who know how to produce a dive magazine better than anyone else in the world. Part of this unchallenged skill is owing to their enormous amount of knowledge and experience. For example, Connie Johnson has served as SKIN DIVER's Managing Editor for over 25 years. Art Smith has been SKIN DIVER's Art Director for 18. SKIN DIVER's secretaries, Ramona Aguirre and Doris Kellogg, have been with the magazine for 12 and 15 years, respectively. While other publications go through continuous personnel upheavals and a round-robbin of staff changes, SKIN DIVER sails along on a steady course with the same crew. The SKIN DIVER editorial staff is made up of a group of highly skilled artisans.

And yet, the editorial staff of SKIN DIVER is only half of the team. The other half is composed of the best diving writers and underwater photographers in America today. These people devote long hours to research, preparation and organization of their articles and photographs. It is not easy to work for SKIN DIVER, because each photo and manuscript must be of the highest quality. SKIN DIVER's contributors are experts in their fields — like the editorial staff, many of them have been working in the sport for 10 to 20 years. They are the pro's who produce the excitement, beauty, drama and vitality that make SKIN DIVER a winner.

The final and most important reason for our success is *you*. In the final analysis, it is the readers who make or break a magazine. This is why SKIN DIVER strives to give you precisely the kind of information you want most. As far as SKIN DIVER is concerned, you come first — and have for the last 30 years!

Commercial Diving Is Serious Business

The demand for natural resources from the sea has never been greater. Twenty years ago, there were only a handful of offshore drilling rigs located in coastal and gulf waters. Today, there are thousands of deep-water platforms throughout the world. The need for qualified personnel to man and operate these facilities is ongoing. Your entry into the world of deep-sea diving will be a most prestigious and rewarding career. *Not only is there a demand for divers in the oil industry, but underwater construction, salvage, farming and environmental awareness need trained technicians also.* Your first step to employment as a commercial diver is training.

Divers Institute of Technology (DIT) was founded by men who have successfully met the challenges of inner-space. They know from experience what it takes to get the job done. Retired Navy and professional deep-sea divers joined forces over 13 years ago to establish a commercial diving school that would train and graduate only qualified entrants to the industry. The success of the DIT program can be measured by our physical growth, the credentials we have attained, and not only the number of top workers we have supplied to major commercial diving firms throughout the world in the oil industry, but to companies in salvage and repair, inspection, underwater farming, etc. *We do not specialize only in the oil industry as some schools do.*

Divers Institute of Technology developed a six-month course that set an industry standard. Training is based on a highly sophisticated deep-sea diving program that prepares you both mentally and physically to enter this new environment. Our curriculum has been designed to prepare you for gainful employment in *all fields* of commercial diving, *not only in the oil industry.* Classroom instruction deals in facts and theory. Open water instruction gives you the practical application of classroom techniques. *The culmination of your training is actual dives to depths of 200 feet. To our knowledge, we are the only commercial school that puts you to this test. The confidence gained from this experience is unequaled.* Before you decide which school to attend, check this point out. Many schools provide only simulated deep dives in recompression chambers and diving tanks on dry land.

After proper training and graduation, you are prepared to enter the commercial diving field. It is then that you will realize a great deal of responsibility comes with the territory. Responsibility to perform the tasks you were trained to do! Responsibility to your diving team and responsibility to all support personnel. *DIT will not graduate a student unless confident he possesses the ability to become a qualified commercial diver.*

Divers Institute of Technology's training facilities are practical. Our site of instruction is located on the Lake Washington ship canal where the water is murky and the visibility is poor; the same environment you will be exposed to in the industry. The equipment used in your training is what you will find in the field.

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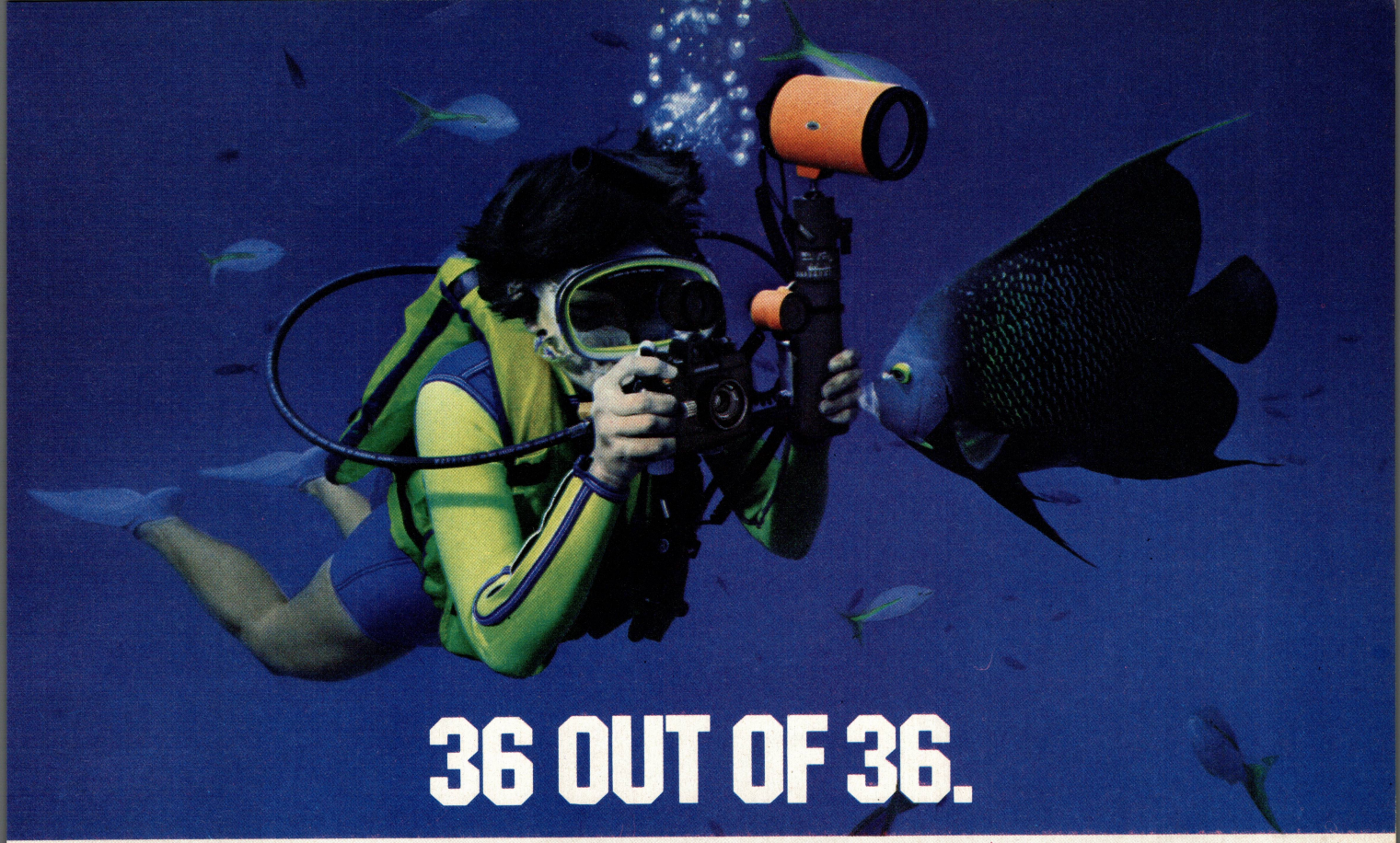

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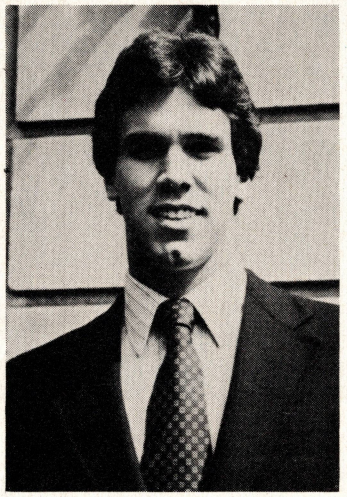
OUR WORLD U/W SCHOLARSHIP

Ted Janulis, a 21 year old Harvard University student, was the recipient of the Our World—Underwater $5000 scholarship.

While at Harvard Ted majored in philosophy and is currently writing a thesis on philosophical interpretations of psychobiological research. He was a member of the Harvard swim team and water polo



team. He co-organized the marine archaeology course, was first president of the Harvard Scuba Club and served as a volunteer at the New England Aquarium.

The purpose of the Our World—Underwater Society is to further the advancement of education in the underwater and water related activities. Applications for the scholarship are available at any time. Processing costs are $15, upon submission of completed application before December 1, for the following year's consideration.

For applications write: Our World—Underwater Scholarship, P.O. Box 4428, Chicago, Illinois 60680; phone (312) 539-4644.

Our World—Underwater XII will be held April 30-May 2, 1982.

COMPTON COURSE

NAUI, in cooperation with Compton (Calif.) Community College, sponsored a course last summer that was designed to get minorities involved in scuba diving.

NAUI executive director Marshall McNott had general responsibility for the program. Ric Powell served as course director and instructor, assisted by Rick Lincoln, a second class diver and Rick Hendricks, M.D., a certified sport diver.

Equipment support was furnished through Dick Bonin of Scubapro and arrangements with Compton College were made through community services coordinator, Robert Spiecker. Also assisting was Scubapro engineer, Jim Dexter.

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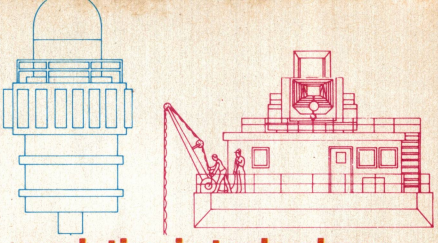

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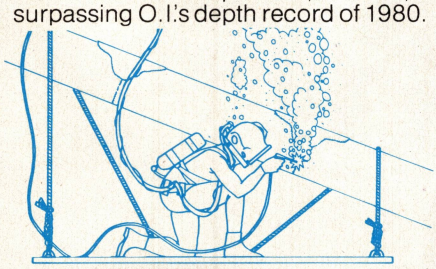

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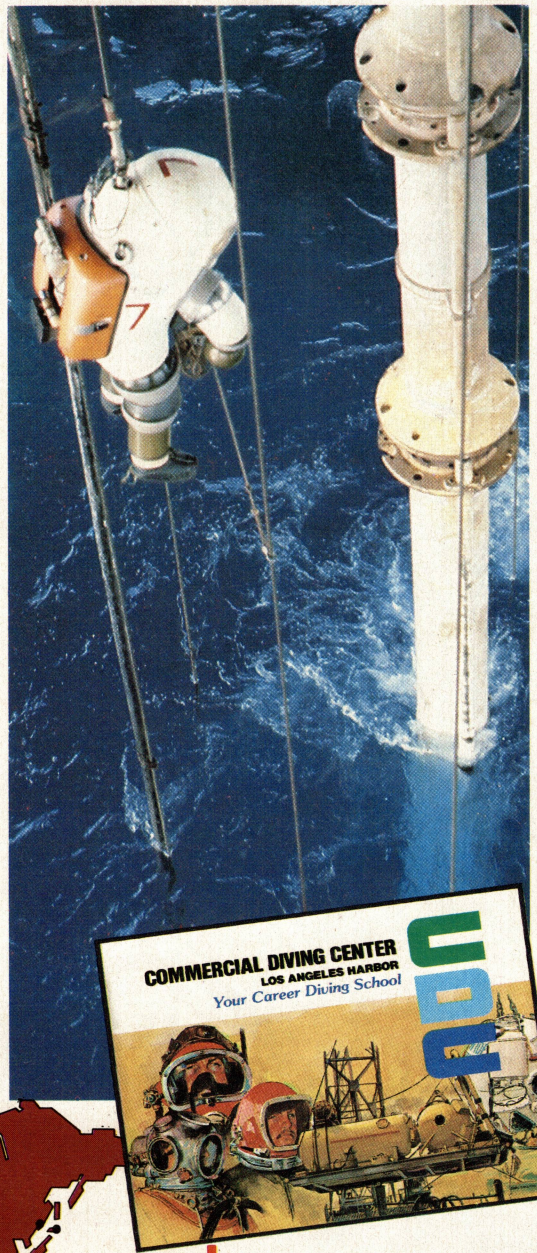

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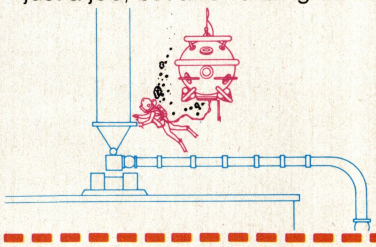

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Diver's Calendar

January 1-2 The 18th National Speleological Society Cave Diving Section workshop, Branford, FL. (Contact: Karen E. Wark, Workshop Chairperson, P.O. Box 4002, Panama City, FL 32401.

December 4 Thirteenth Annual San Diego Council of Divers Awards Banquet. Door prizes, photo contest and unusual entertainment. (Contact: James "Leroux" Redman, P.O. Box 9259, San Diego, CA 92109; (714) 283-3628)

December 4-6 Sports Medicine Conference — Athletes and Health, Ramada Inn, El Rancho Raquet Resort, Sacramento, Calif. Sponsored by the Pacific Physical Therapy & Sports Medicine Center and the Univ. of Calif. San Francisco School of Medicine. (Contact: Extended Programs in Medical Education, UCSF, (415) 921-1800)

January 10-16 The Temple University Underwater Medicine Program, Grand Cayman. Category I course on underwater medicine, physiology and marine toxicology. (Contact: the Office of Continuing Medical Education, Temple University School of Medicine, 3400 North Broad St., Philadelphia, PA 19140)

January 30 Great Lakes films. St. John's School for the Deaf auditorium, Milwaukee, WI. Featuring John Steele. Sponsored by the Buccaneer Scuba Club. (Contact: John Herrenbruck, 3016 East Armour Ave., St. Francis, WI 53207; (414) 482-1652)

February 6-13 Medicine of Sport Scuba Diving course, Flamingo Beach Hotel, Bonaire, NA. Emphasis on medical preparedness for diving emergencies. (Contact: Medical Seminars, Inc., 11406 Whisper Moss, San Antonio, TX 78230; (512) 492-5656)

February 27 Sixth Annual Divers Showcase, Lansing City Center. Artifacts, equipment, slides, dinner and film fest. Senior citizens free. (Contact: Capitol City Dive Club, P.O. Box 1055, East Lansing, MI 48823)

February 27-March 7 A diving medicine course at the Flamingo Beach Hotel, Bonaire, NA. Emphasis on identification of marine animals that inflict wounds. (Contact: Dive-Med International, The Gruehn Bldg., 3001 S. Hanover St.. Baltimore, MD 21225; (301) 355-1903)

March 5-7 YMCA assistant instructor course at the Countryside YMCA, Lebanon, OH. (Contact: Timothy Patton, 7562 Township Line Rd., Waynesville, OH 45068; (513) 897-7288)

March 12 Twenty-eighth Annual Boston Sea Rovers U/W Clinic. Lectures, seminars and underwater films. (Contact: Glen Reem, 30 Rockville Ave., Lexington, MA 02173)

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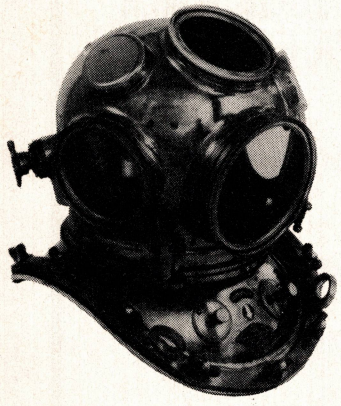

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Scuba Quiz

Category: SKIN DIVER Trivia

By Dennis Graver

SDM has served as the hub of the dive industry for three decades. This magazine and its staff has been instrumental in the development of diving and the protection of both the sport and the environment in which it takes place. While the information in this month's quiz may be unfamiliar to you, it will be interesting to guess at some little known facts about the publication and its staff. Answers are on the following page.

NOTE: Select all correct answers: Some questions have more than one correct response.

1. The first issue of SDM was published in _____ and contained _____ pages.
- ☐ A. November, 1951, 56
- ☐ B. December, 1951, 16
- ☐ C. January, 1951, 48
- ☐ D. December, 1951, 52

2. The original themes for SDM were:
- ☐ A. Instruction
- ☐ B. Club news
- ☐ C. Spearfishing
- ☐ D. Product reviews
- ☐ E. Photography

3. Which of the following people have held the title of Editor-Publisher for SDM:
- ☐ A. Jim Auxier
- ☐ B. Bill Barada
- ☐ C. Al Tillman
- ☐ D. Paul Tzimoulis
- ☐ E. Jack McKenney

4. The original subscription rate for SDM was:
- ☐ A. $2.40 per year
- ☐ B. $3.00 per year
- ☐ C. $4.80 per year
- ☐ D. $5.00 per year

5. The author(s) whose column has appeared longest in SDM is:
- ☐ A. Fred Roberts
- ☐ B. Hillary Hauser
- ☐ C. E. R. Cross
- ☐ D. Jim and Cathy Church
- ☐ E. Al Tillman

6. The two companies whose advertisements have appeared longest in SDM are:
- ☐ A. U.S. Divers
- ☐ B. Scubapro
- ☐ C. McWhorter
- ☐ D. AMF Voit
- ☐ E. Healthways

7. How many publication deadlines has SDM failed to meet since its inception:
- ☐ A. None
- ☐ B. One
- ☐ C. Three
- ☐ D. Nine

8. Which person has been employed longest with SKIN DIVER:
- ☐ A. Connie Johnson, Managing Editor
- ☐ B. Paul Tzimoulis, Editor-Publisher
- ☐ C. Bill Barada, Marketing Manager
- ☐ D. Jack McKenney, Editor
- ☐ E. Al Tillman, Director of Public Affairs

9. The first full color underwater cover photo for SDM was published in:
- ☐ A. 1951
- ☐ B. 1955
- ☐ C. 1965
- ☐ D. 1961

10. The photographer with the greatest number of Fish Of The Month photos is:
- ☐ A. Jack McKenney
- ☐ B. Paul Tzimoulis
- ☐ C. Jerry Greenberg
- ☐ D. Carl Roessler

11. SDM is currently distributed in _____ countries:
- ☐ A. 31
- ☐ B. 56
- ☐ C. 87
- ☐ D. 109
- ☐ E. 112

12. These quizzes, originally known as the National Scuba Exams, have appeared in SDM since:
- ☐ A. 1968
- ☐ B. 1973
- ☐ C. 1975
- ☐ D. 1977

Scuba Quiz

Answers: SKIN DIVER Trivia

1. B. December, 1951, 16. SDM had a humble beginning as a 16 page, black and white publication. It was more like a newsletter than a magazine, but it filled an important need by serving as a medium for the exchange of information about diving. Over the years, SDM has steadily expanded. The greatest number of pages in a single issue was 136.

2. C. Spearfishing, B. Club news. While not as popular today, spearfishing was responsible for the early development of diving and competition between divers and clubs created the heroes of the day. In the late 1950's, attention shifted to dive instruction; and, more recently, to equipment, photography, and travel.

3. A. Jim Auxier, D. Paul Tzimoulis. During its entire 30 year history, SDM has had only two Editor-Publishers. Jim Auxier was the first, working in the capacity for nearly 15 years. Paul took over from Jim and has managed the magazine for just over 15 years.

4. B. $3.00 per year. SDM has always been a bargain. The current subscription rate is only $11.94/year — less than $1 per issue. Compared to inflation and the increases of other publications, the cost of SDM has remained quite reasonable.

5. C. E. R. Cross. The current Technifacts-type of information has been published almost since the inception of SDM and its author has remained the same — master diver E. R. Cross. Hillary Hauser's Fish of the Month series claims second longest, while the Church's underwater photography articles come in third, having appeared for eleven years.

6. A. U.S. Divers, C. McWhorter. Both McWhorter, offering compressors, and U.S. Divers, originally Rene Sports, have used this magazine to advertise their products longer than any other companies in diving.

7. A. None. Other than one combined issue (March-April, 1952), SDM has published a magazine on time every month for 30 years! One issue was nearly destroyed by a fire, but somehow survived to meet the publishing schedule. It will be very difficult to improve this record during the next 30 years . . .

8. A. Connie Johnson, Managing Editor. Connie has been with SDM for over 25 years. Paul Tzimoulis has the next longest years of service with just over 15 years. Others listed in the answers were employed by SDM less than ten years.

9. B. 1955. SDM went from a black and white publication to two-color printing, to full color. The first full color issue was printed in May, 1955 and the first full color cover, a photo by Jordan Klein, was published in October, 1955.

10. A. Jack McKenney. The popular Fish Of The Month feature has been in SDM since Sept., 1970. Jack McKenney photographed 36 of the fish. Carl Roessler is close behind with 25.

11. D. 109. Since its beginnings in Lynwood, California, SDM has continually expanded its sphere of influence in the diving world. Currently, it is read by more than 1,000,000 people monthly in over 100 countries.

12. C. 1975. It has been my pleasure to author these exams for nearly six years. They have provided a forum to bring little known information to the attention of a great many divers. I appreciate this opportunity to share with others in diving what other divers have shared with me.

If you guessed more than half of the answers correctly, you've been diving and reading SDM quite awhile, or you were simply lucky! No matter how well you scored, you'll probably be interested in reading the article on SDM's history, authored by Bill Barada, that appears in this issue.

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THE PAIN OF FAME

Rare Grouper Family Threatened With Senseless Extinction

By Valerie Taylor

Eight and one-half years ago, Ron, myself and several other people were fortunate enough to find a family of potato cod (a form of giant grouper) on the northern end of Australia's Ribbon Reef. Only once before, on the Island of Europea in the Indian Ocean, had we seen a similar colony. It consisted of more than 100 animals, most of which were killed by South Africans on a spearfishing expedition and sold as pet food to defray their expenses. On our second visit to the Australian Cod Hole (as we now called it) one of our party speared a large one. Ron and I were horrified. We managed to extract the spear from the fish's throat and spent some time walking it, but to no avail. The poor creature eventually died.

We decided never to take anyone else to the Cod Hole, and for the next few years, although we passed it many times, we made no mention of the great friendly fish that lived there.

Then, in June of 1979, we were working on an hour long TV special for Time/Life Films. The subject was the reef, but we needed more drama than what was available in the workable areas. We needed something big, exciting and rare, like the potato cod.

We went back to Ribbon Reef. The cod remembered us (fish definitely do remember) and swam over the minute we appeared. We filmed them, fed them, played little tricks on them and they became the highlight of the film.

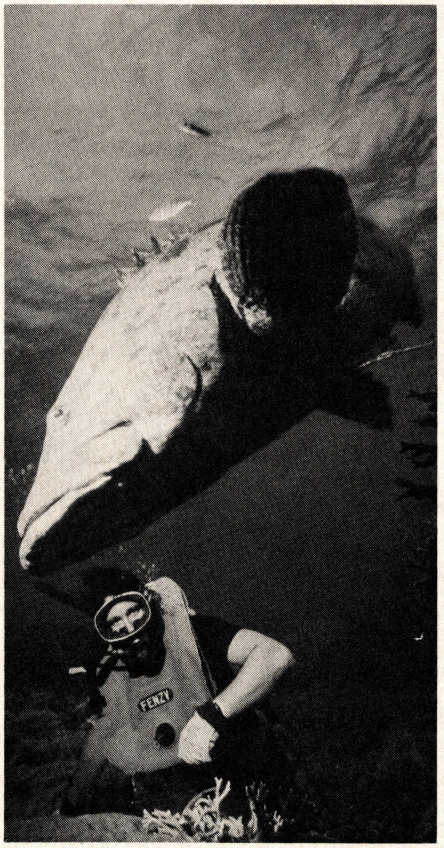
Unfortunately, they also became known. Our skipper, Barry May, who runs a charter boat from Cairns, started taking divers to visit the cod. (No spearfishermen are allowed on the dive boats working out of Cairns. The skippers know it's impossible to sell a dead reef.

Paul Tzimoulis, the editor/publisher of SKIN DIVER Magazine, featured these fish in a July, 1981 article on Australia. Qantas published one on the cover of a brochure. The potato cod had become public property.

Not long ago Ron and I were in Cairns preparing to once again film the cod. While loading our boat, Peter Bristow, skipper of a local game boat, told us that some game boat skippers had been taking clients to the Cod Hole to hook and spear the big fish. It appeared that if no marlin were caught and the client was feeling a little put out, the killing of a big cod soothed the disappointment.

We were understandably distressed by the news. We had worked with the cod for three days. There had been 20 adults, now there were 10. Some had hooks embedded in their bodies. Others had mouths damaged by hooks. For a few moments of pleasure, thrill-seeking fishermen had killed ten of these huge, friendly fish.

photo/Geri Murphy



In a short time, nearly 50 percent of the giant Cod Hole groupers have been killed.

The potato cods are territorial, living in a tight family group consisting of ten adults and about six young.

Other than in the Indian Ocean, this is the only colony we have seen in 26 years of diving. Individual specimens have been sighted occasionally (there is one small animal on the wreck of the *Yongala*), but a family such as this is rare indeed. Potato cod grow to 80 kilos (176 pounds) in weight and have the most endearing and friendly personalities of any fish we have met, swimming up to the diver or snorkeler without fear or hesitation. Because they are so tame, marine biologists would find them wonderful to work with and study for long periods.

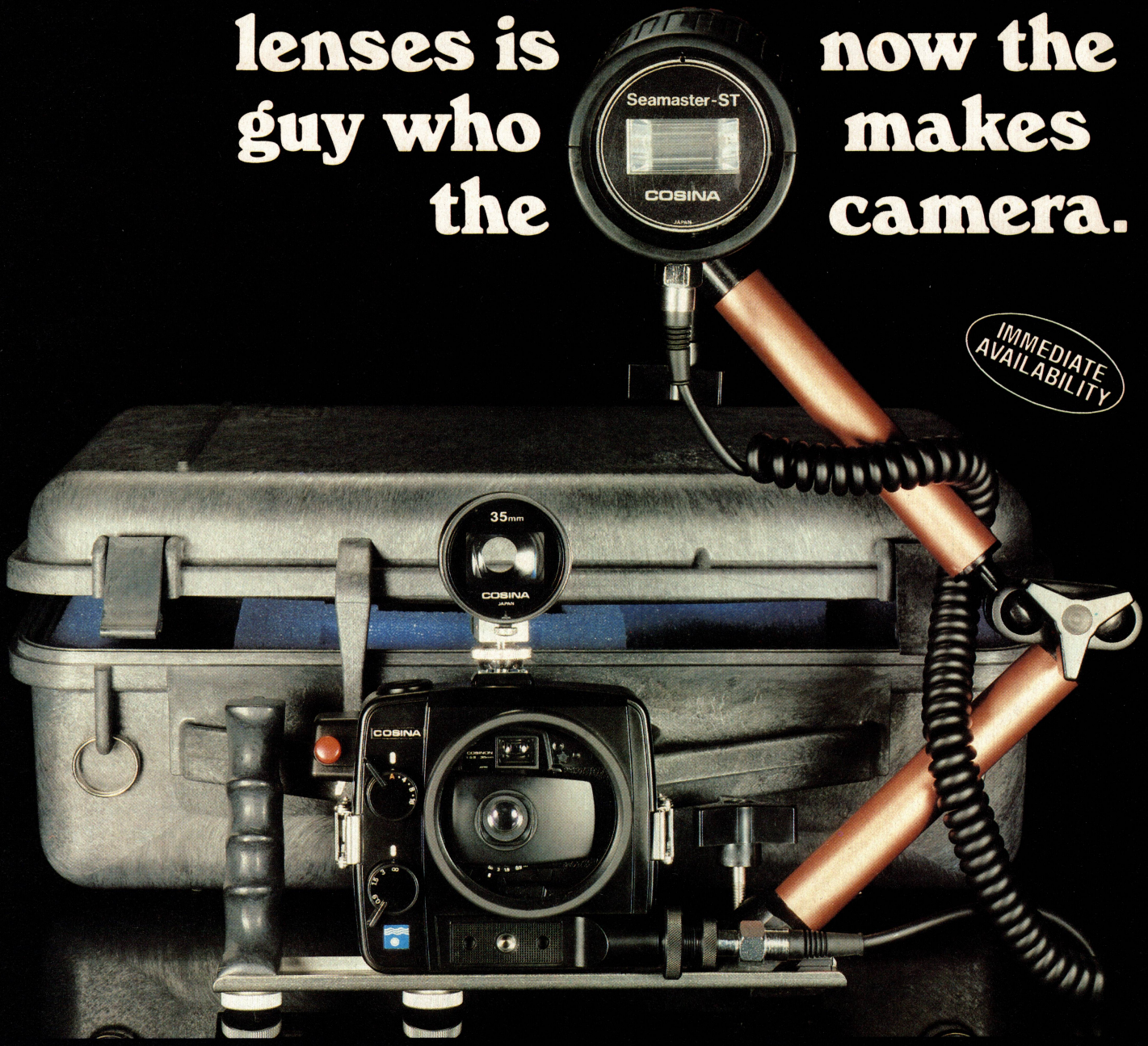
We could find no record of them in any Australian fish book, including Grant's *Guide to Fishes*. In fact, the only mention at all was in the big Japanese book, *Coastal Fishes of Southern Japan*, where it was recorded that only two specimens had ever been taken and that the animal was rare. They could be more than 100 years old. Big fish live a long time.

That it is legal to kill these creatures for a few moments' pleasure, when alive they could give thousands of people days of enjoyment, is a crime. The Cod Hole is the best dive adjacent to Cairns and it is becoming universally famous.

The Great Barrier Reef Marine Park Authority has, for two years, been endeavoring to have the cod hole area proclaimed a marine park. Only the Queensland government's reluctance to agree is stopping it. All the cod need for survival is a protected area, a mere two kilometers square. This can hardly be asking too much in an area that totals 1600 kilometers. Let us hope that something is done for the big cod soon, before they are hunted to extinction.

Editor's Note: If you're upset about the killing of these beautiful creatures, put your protests in letter form. Send them to: Mr. Graham Kelleher, Chairman, Great Barrier Reef Marine Park Authority, P.O. Box 1379, Townsville, QLD., Australia 4810.

The guy who made the lenses is now the guy who makes the camera.



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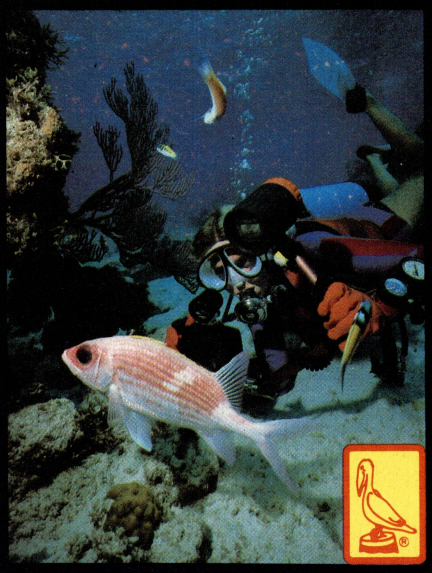

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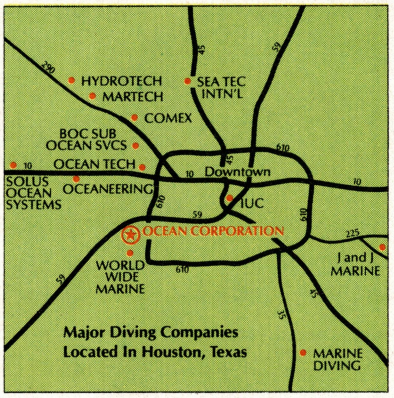


BECAUSE

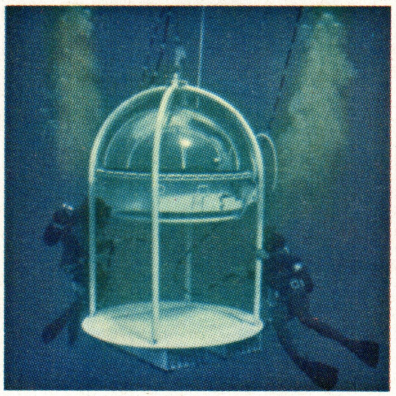
The Ocean Corporation is a commercial diving company, not just a school. Our facilities, equipment and training aids are the best, and our diving systems are as up-to-date as possible... because much of the equipment is used by our diving operations division to perform actual diving contracts in the field. Ocean Corporation has successfully completed many underwater jobs for various industrial clients over the years... including specialized underwater inspections, maintenance and repair work. For example, we did the world's first commercial underwater repair job in a nuclear power plant. And most of our divers have been graduates of our own school.

BECAUSE

The Ocean Corporation is a convenient and exciting place to go to school. Houston is one of the fastest-growing and most dynamic cities anywhere. It is a city of expansion, energy and youth (the average resident's age is in the mid-20's). Houston offers every conceivable kind of entertainment, from sports events, ultra-modern discos and open-air theater to rough-house local rodeos, chili cook-offs and the new Texas-size country-western dance clubs. Reasonably priced adult and singles apartments are readily available within walking distance of the school, and fast-food to luxury restaurants are nearby. The semi-tropical climate is wonderful, the sport diving is great and the folks are friendly.

BECAUSE

The Ocean Corporation management and instructor staff have long-term experience in the international offshore oilfield diving business. Retired ex-military divers and sport scuba divers don't run the school...*commercial* divers do. For example, the President of The Ocean Corporation, Larry Cushman, was Vice President and Europe/Africa Area Manager for Ocean Systems, Inc. for three years...with responsibility for all North Sea diving and underwater construction operations. He also worked six years as a manager for Oceaneering International, Inc., another of the world's largest commercial diving contractors. Ocean Corporation managers and instructors know today's diving business...first-hand, from recent experience.



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The Way We Were

Winter of '51 officially launches a new sport with a magazine called Skin Diver

By Bill Barada

caption on next page

This month is SKIN DIVER's 30th anniversary. I remember the first issue, launched in December, 1951, as such a skinny, anemic-looking package it would no doubt be laughed at by modern divers. But to those of us who were diving at that time, the first SKIN DIVER was a thing of beauty and its pages bring back a flood of memories about the way things really were in the "good old days" of our sport. The truth is that dive conditions were so chaotic and our ignorance of the underwater world was so colossal that I often wonder how the sport managed to survive. Underwater history was being made in those days and the launching of SKIN DIVER Magazine was a landmark event that occurred at exactly the right time and in the right place to exert a profound impact on the future. Some background information is needed to set the stage for a full appreciation of the significance of SKIN DIVER's role in the era of underwater pioneers.

Contrary to popular belief, sport diving did not begin in 1949 with the introduction of the Aqua-Lung. Skin diving got its start in Southern California during the Great Depression of the 1930's and the world's first dive club, the San Diego Bottom Scratchers, was formed in 1933. But the only equipment available was waterproof goggles and homemade fish spears, so only a handful of rugged individuals was active. Facemasks began to show up in 1938 and Olympic yachtsman, Owen Churchill, introduced swim fins in 1940. I made my first flippered dive in about 20 feet of water off Flat Rock Point, Palos Verdes, California and the increased power of the fins shot me to the bottom so much faster than I was accustomed to that I almost bashed my head on the rocky bottom.

Modern scuba diving and underwater exploration would not be possible without flippers. Evidence of this is that a successful demand regulator for scuba was patented in the U.S. by Renoist Rouquayrol in 1866, but it was never accepted because no flippers existed, and thus no market for such a device could develop.

The next major advance in skin diving was the introduction of cold water suits after the end of World War II in 1945. A member of my dive club, the Los Angeles Neptunes, obtained a U.S. Navy frogman suit long enough to lift a pattern from it. The patterns were sold to Neptune members for $1, and homemade frogman suits began to appear throughout the Los Angeles area. The word spread, other divers joined the Neptunes to obtain a cold water suit, and the membership soon became so large and unwieldy that splinter groups broke away to form separate clubs. Thus the frogman suits of the L.A. Neptunes (America's second dive club, formed in 1940) were responsible for a rapid multiplication of dive clubs throughout Southern California. The suits permitted diving to expand into cold water areas and clubs with names such as the Puget Sound Mudsharks, Boston Sea Rovers and Coast of Maine Neptunes began to appear.

My first frogman suit was made from hospital sheeting and bonded together with rubber cement. I tried it the day after one of Southern California's rare snow storms and the water temperature was down to a cold 49 degrees. The suit was poorly made and leaked like a sieve. But it worked. For the first time in my life I was warm in the water and I enjoyed more than two hours of diving before I finally froze out. My average time before that, even in summer, was less than half an hour.

My enthusiasm for cold water suits was responsible for my first venture into the business of manufacturing dive equipment. I started by selling my old suits in order to make myself a new, improved model. The word spread and this led me to form the Bel-Aqua Water Sports Company, which did a thriving nationwide business until years later, when the more popular wetsuits took over the market. Other divers were also making and selling gear, but in the early days our sales were entirely by word-of-mouth because SKIN DIVER Magazine did not yet exist, professional dive shops had never been heard of, and sporting goods dealers had no interest in handling skin diving equipment other than masks and flippers.

This situation changed in 1949 when a Frenchman named Rene Bussoz imported Cousteau's Aqua-Lung to America and began selling them out of his sporting goods store in Westwood, California. These first scubas consisted of a 38 cubic foot cylinder, a two hose regulator and a harness. They sold for $250. I traded Bussoz three of my rubber suits for one Aqua-Lung. No instructions were available. Bussoz told me, "You know how to dive. Just put it on and go ahead. It's automatic."

My first dive with my new scuba was off Point Dume Malibu. I loaded it into a rubber boat and, with my wife, Harriet, aboard, I headed for the offshore kelp beds. Diving alone was commonplace in those early days because the buddy system was unknown. Also unknown were other safety rules such as the use of quick release buckles and slip hitches to allow instant removal of a tank. I strapped the Aqua-Lung on tightly so it could not possibly work loose, then slipped into the water.

It took a few seconds to adjust to breathing underwater, then I felt an exhilarating sense of freedom. I had no feeling of urgency or time limitation as with breath-hold diving and I drifted down along the face of the reef into depths I had never reached before. I hit a bonanza of lobsters, abalone, and large fish. When my tank ran out of air and I headed for the surface, my goody bag was loaded and my stringer was full of fish.

I surfaced in the middle of a dense kelp bed about 50 yards from my boat and tried the usual holding my breath method of submerging and swimming to the boat beneath the kelp canopy. But the unfamiliar scuba became tangled in the seaweed and I found myself fighting to keep my head above water while being dragged down by an empty tank, a water-logged rubber suit, a 16 pound weightbelt and about 50 pounds of abalone, lobsters and fish. I yelled for my wife to row the boat to me, then watched in dismay as her efforts were frustrated by a combination of wind and kelp. Gasping for air, I dropped my goody bag and struggled desperately to free myself from the deadly scuba. Fortunately, Harriet reached me in time or that first Aqua-Lung dive would have been my last.

Others were not so lucky. New divers and dive clubs were forming all across the nation and the sale of Aqua-Lungs rapidly expanded. At the same time a host of oxygen rebreathers obtained from war surplus stores hit the market, along with imitation Aqua-Lungs and homemade scubas. This was before any safety rules for scuba diving had been established or published and such things as certified instruction did not exist. Under these circumstances, it is

SDM's first issue was only 16 pages featuring Dr. Nelson Mathison of Long Beach on the front cover. This small beginning mushroomed into today's 100 plus page monthly. We still maintain the original concept voiced in that first editorial — "You as a skin diver will find the magazine interesting from cover to cover because it was compiled, written and published with you as its reader. We hope you enjoy it." 2. Divers from Norwalk, Conn., welcome in the new year. 3. Frank White instructs students at Cedar Lake, Conn., in the late 50's. 4. Del Wren of the Long Beach Muirmen was member of the U.S. team to the '59 World Spearfishing Championships in Malta. 5. Ron Church, pioneer in U/W photography, started diving the early traditional way — with a giant black sea bass.

First SDM Editor/Publisher Jim Auxier and Managing Editor Connie Johnson recognize Lloyd Bridges' contribution to the growth of diving. 1. Bill Barada. 3. Early days saw lots of divers hit the beach for spearfishing contests. 4. Jim Christianson, Lee Jamison and Bob Manicki at '56 Laguna Beach meet. 5. Chuck Blakeslee and Paul Hoss. Chuck (left) and Jim Auxier (6.) were original partners in starting SDM. 7. Bing Copeland, Bev Morgan, Greg Noll and Bob Hogan at '51 west coast surf contest. 8. Homer Lockwood with record 60 lb. roosterfish. 9. Al Tillman. 10. Lamar Boren. 11. SDM Art Director Art Smith and current Editor/Publisher Paul Tzimoulis. 12. Owen Lee. 13. Rigged for early spearfishing. 14. Still from movie "The Silent World." 15. Early exposure and dive gear. 16. Doc Mathison, Dee and Mel Fisher. 17. Alma Beck and Susan Edmands, Florida spearfisherwomen. 18. Eugenie Clark spears poison fish in '51 Red Sea expedition. 19. Jordan Klein aboard Mako.

little wonder that a lot of the people who purchased this equipment were dying. The combination of crude, homemade equipment and ignorance of the underwater world made scuba diving one of the world's most hazardous sports. An army of would-be underwater explorers were invading inland ponds, rivers and lakes as well as the oceans and they died by the hundreds. Some of these novices were pulled from the water fully dressed in street clothes and others tried to use scuba before they learned to swim. Anti-skin diving sentiment was increasing and restrictive legislation was proposed in a number of states.

These were the chaotic conditions that confronted sport diving when SKIN DIVER Magazine published its first issue. One of the greatest services it performed in those early years was that it put divers and dive organizations in touch with each other to share information and experiences. The policy of the magazine, as stated by its publishers, Jim Auxier and Chuck Blakeslee, was, "It's your magazine. You write it. We publish it." And because there were no recognized sport diving experts, this encouraged anyone to sound off on any subject affecting skin diving. The writing quality was usually poor, but divers were so eager for information they read anything, the advertisements as much as editorial material, and a good idea that appeared in SKIN DIVER was quickly adopted and spread across the nation. This is how the certified instruction and training programs came into existence.

The idea was introduced by Bev B. Morgan, a Los Angeles County lifeguard, who convinced L.A. County officials that the number of scuba rescues and fatalities within their jurisdiction warranted the establishment of training classes for dive safety under the Department of Parks and Recreation. As a result, a panel of commercial divers, educators and scientists was assembled and the L.A. County program of scuba instructor training and certification, the world's first, was born.

The county was legally restricted from expanding outside its jurisdiction, but thanks to SKIN DIVER Magazine, the idea was picked up throughout the nation and across the world. The YMCA opened its indoor swimming pools and other facilities to scuba training and a Y instructor certification program was made available on a national scale. NAUI and PADI programs followed later and similar projects were established in foreign countries. As a result, certification is now universally accepted, scuba diving is taught in colleges and universities and underwater exploration has established an enviable record as a safe outdoor sport.

Dive clubs played a vital role in shaping early skin diving history and when they joined forces by forming regional councils they became even more influential and effective. The California Council of Diving Clubs was the world's first such organization. The idea was triggered when I learned that the State Fish and Game Commission had outlawed the use of scuba for taking abalone. The law was passed at the request of a single dive club that claimed it spoke for all California skin divers. I made a few phone calls and learned that other dive clubs were never consulted about the proposed legislation. The clubs got together and formed the Council of Diving Clubs in order to make sure the same thing never happened again. After SKIN DIVER published the announcement, regional councils were formed by clubs in other states. In 1969 the councils joined together to form the Underwater Society of America and the World Underwater Federation was established later the same year.

I served as president of the newly formed California Council during its first four years and we were besieged by proposals for laws and regulations on virtually every facet of skin diving from spearfishing to compressed air stations. A surprising number of these came from members of dive clubs and other dive organizations who either had a personal axe to grind or labored under the misguided idea that the best way to solve a problem is by passing a law.

An example of this was the issue of bad air being pumped by some of the dive shops and other retail stores that were setting themselves up as scuba air filling stations. Divers were becoming violently ill from breathing contaminated air and these reports were verified by laboratory tests which showed the air from tanks filled at some air stations contained carbon monoxide, oil and other noxious fumes that could be deadly to a diver.

There was an immediate outcry of, "Let's pass a law," accompanied by demands for state licensing and inspection of all scuba air stations. But a number of us pointed out that such a law would entangle scuba diving in a straight jacket of legalistic regulations, written and implemented by bureaucrats who neither knew nor cared anything about skin diving. We also contended that a bad air law would not assure us of getting pure air because slippery characters could find ways of circumventing the regulations.

Fortunately we had a better idea. The offending air stations were verbally informed that the California Council had evidence they were pumping bad air and if the practice continued beyond a specified date, all dive club members in California would be notified of the fact.

The results were spectacular. Sleazy shops went out of business, careless and incompetent compressor operators were replaced, and some stores hired compressed air specialists to redesign their systems. The idea spread across the nation with virtually every dive club and dive organization acting as self-appointed clean air inspectors. SKIN DIVER got into the act by publishing articles listing the most common sources of bad air and listing only certified air stations in its Diver's Directory. As a result, bad air has virtually been eliminated as a problem for modern divers — and the expensive burden of government regulation has been avoided.

This cry of, "Let's pass a law," has been repeated over and over again down through the years and it is disheartening that so many times it comes from a prestigious dive organization or a competing dive publication. But, SKIN DIVER has always come out strongly on the side of self regulation, self discipline, and education. And this, in my opinion, is one of the reasons SKIN DIVER has survived and the others have failed. And it is also one of the reasons our sport enjoys a unique freedom from bureaucratic regulation.

Underwater cameras also played a vital role in the history of skin diving. The first waterproof housings were made from makeshift materials such as rubber gloves and pressure cookers. Housings of plexiglass and metal castings became popular in the mid-1950's and a lot of divers exchanged their spearguns for cameras. Television travel shows such as Bold Journey gave amateurs a potential market and were an added incentive for underwater movie-making.

I ventured into underwater photography in 1957, convinced that a film of skin divers wrestling the giant octopus of Puget Sound would make a lot of money. My octopus film won the Classic award at the International Underwater Film Festival and played on television for 10 years. But it didn't make a profit, so I sold the camera and went back to freelance writing.

Fortunately other filmmakers did not give up and the International Film Festival held in Santa Monica, California attracted underwater photographers and diver-audiences from all over the world. The event was organized and run by Al Tillman, but it was sponsored and promoted by SKIN DIVER Magazine. The magazine's sponsorship was cancelled after Jim Auxier retired as publisher, and this film festival was discontinued a few years later.

Professional underwater movies were also making it big in theaters and the Sea

(Continued on Page 98)

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FREEPORT'S FABULOUS U/W CAVERNS

The mere word cave suggests adventure and intrigue with rich images of pirate treasure, smugglers' havens and a journey to the center of the earth. Modern exploration has removed much of the mystery from caves, yet their mystic lure prevails. Underwater caves are no less interesting, only more difficult to explore; providing experienced divers with what many believe to be, "the absolute challenge of the sport."

The best opportunity to safely experience the thrill and adventure of true cave diving is on the island of Grand Bahama, 60 miles east of Palm Beach, Florida. Here, at the Underwater Explorers Society (UNEXSO), a professional program has been established to provide the certified instruction, specialized equipment and guided tours necessary to safely answer the lure of the caves. It is fitting that this advanced activity is available at UNEXSO for it has been a pioneer in the development of the complete dive program concept. Under the direction of owner/manager, John Englander and chief instructor, Lou Fead, the Underwater Explorers Club offers a wide variety of basic and advanced instruction with daily offshore and inland trips to appeal to all levels of experience.

It is fitting, too, that a specialized cave program be located on Grand Bahama. Beneath the island is the incredible world of the Lucayan Caverns, a complex system of yawning pits concealing glassy pools that lead to splendid natural ballrooms adorned by graceful columns, waterfalls, and icicles of stone. This spelean spectacle is so chilling that it has been known to leave some divers babbling for hours afterward and others numbed and speechless as if struck by a thunderbolt.

To get the complete story, I enrolled in the six day cave diving course. For divers with basic certification and a log book there is a

TEXT AND PHOTOGRAPHY BY RICK FREHSEE

Opposite, Gene's Garden and its passageways offer an incredible journey through an enchanted forest of fragile, crystal stalagmites and stalactites.

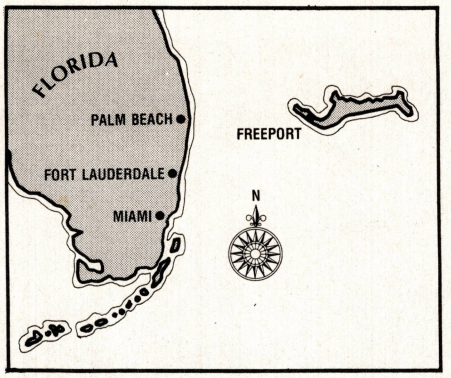
Left, the flowstone of Waterfall I looks like moving water. Right, Howard Cosgrove and Jeanette Holmes pause in the entrance chamber of Ben's Cave.

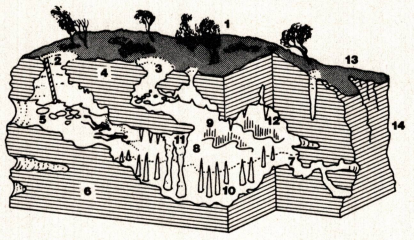
choice of a three day, three dive cavern course or a six day, 12 dive cave course which includes most of the dive and specialty equipment. In addition to exploring the Lucayan Cavern complex, students in the cave course are given the opportunity to explore the ocean blue holes noted for their reversing currents and teeming sea life. When the course is successfully completed, divers are certified by either the cave diving section of the National Speleological Society (NSS) or NAUI at the student's preference. Certification from the National Association for Cave Diving (NACD) is also available. For those who already have cave diving certification and experience, special three and six day guided tours are available. My student companions were Jeanette Holmes, a Miami diver with considerable open water experience and Howard Cosgrove, a Grand Bahama resident via New Jersey who has been diving since 1974. Neither Jeanette nor Howard had ever been in an underwater cave. I had considerable cave diving experience, but practically no knowledge. I had always been guided by a local expert. My greatest asset as a cave diver was being a good judge of character and thus, as I took the pictures, experts such as Sheck Exley, George Benjamin and Tom Mount led the way.

Our instructor was Mary Brooks, the Chris Evert of cave diving, who weighs 97 pounds and never fails to raise eyebrows when walking with 85 pound doubles. Although a tiny, fair-skinned blonde is not the image of a cave diving instructor, Mary's expertise immediately inspires confidence. Her maturity and good judgment are derived from physical fitness, experience and ability.

We spent the first few days making cavern dives and shallow penetrations at the Lucayan Burial Mounds and in Ben's Cave, two of the major sinkholes with entrances to the Lucayan Cavern complex. The course philosophy is to learn proper techniques in the real cave environment. There is no pool work and most of the lectures are given informally, often in the van during the 30 minute ride to the dive site. With a maximum of three people in a course, individual attention is assured. The greatest physical challenge in the cave course is the short walk from the van to the sinkhole and the subsequent descent by ladder to the rockpile at the entrance pool. Be advised that a 100 yard walk with double tanks and full wetsuit in the hot Bahamian sun is roughly equivalent to two rounds with a young Muhammad Ali.

The basic techniques of cave diving include planning; air management; equipment streamlining; buoyancy and body positioning; silt techniques; and guideline and reel use. These are practiced in or near the entrance rooms to the two big caves. Each dive is progressive in terms of tasks and in the complexity





1 Pine and scrub forest
2 Ben's cave (sinkhole)
3 Lucayan Burial Mound
4 Porous limestone rock
5 Rockfall
6 Impermeable rock
7 Gallery (passageway)
8 Chamber
9 Drapery (flowstone)
10 Stalagmite (floor)
11 Column
12 Stalactite (ceiling)
13 Mangrove lowlands
14 Ocean

CAVERN CREATION

When rainwater percolates through the soil, it becomes charged with carbon dioxide, forming a mild acid capable of dissolving limestone. Thus, small cavities develop which gradually enlarge to form sinkholes, vertical shafts and chimneys, horizontal galleries and even large chambers. After thousands of years the limestone becomes honeycombed with a complex labyrinth of chambers and passages.

Seeping water is also the agent that decorates caves with elaborate formations. As it erodes the limestone, it becomes saturated with dissolved minerals which are redeposited in thin layers on the surface of the caves. Stalactites grow down from the ceiling and stalagmites grow up from the floor; the two sometimes meet to form columns. The thin films of mineral water also create majestic flowstone formations in drapery, waterfall and candelabra effects to complete the visual fantasy. Changes in sea level during and after the last ice age account for the drying and flooding cycles.

The full extent of the Lucayan Caverns is unknown, but nearly five miles of explored passages and exquisite dripstone and flowstone formations lay title to the most extensive and decorated underwater cave system in the world.

of the passageways and chambers, to whet the appetite for further discovery. In the last few days of the course we were comfortable with our techniques and totally consumed by the strange and eerie beauty of the Lucayan complex. We began to learn a new and wonderful language and words like soda straws, flowstone, moon milk and puddleshine took on new and special meaning. We had all gained access to a world as strange and different as a forbidden planet. Jeanette summed it up perfectly when she began referring to herself as a born again diver.

The entrance chambers alone are marvelous experiences. Just beyond the light flooded surface pool at the Lucayan Burial Mound is the dome shaped skylight room with a small opening in the ceiling that allows a laser-like beam of sunlight to penetrate 30 feet of crystal water and dance on the floor below. A short distance from Ben's Cave is a huge entrance chamber with an unusual collection of massive flowstones and dripstones. From the backside of that chamber a diver can view several of the huge monoliths in silhouette against the hazy light from the cave opening — a scene reminiscent of a time when dinosaurs ruled the earth.

The most convincing evidence of cave splendor is in the Waterfall rooms, in Gene's Garden and in the Wedding Hall. The Waterfall rooms are back-to-back and are named for the beautiful patterns of flowstone which look like moving water frozen in position. But they are as different as they are similar; Waterfall I is a horizontal composition while Waterfall II is a vertical design inside a high dome shaped chamber. The passageways, galleries and chambers of both Gene's Garden and the Wedding Hall offer an incredible journey through a forest of crystal-tipped dripstones. On the way, you swim through a halocline (transition zone of salt to fresh water) that temporarily blurs your vision as though you were being transported in time and space. When it clears, the dream begins and you are in a wonderland of needle shapes and graceful columns. Bold stalagmites, more numerous than any other feature, rise majestically from a floor of brown silt. The silt, or "mung," has laid still for centuries but now threatens to burst into a thick cloud with the careless movement of a fin. Although similar, no two dripstones are exactly alike; some are slender as toothpicks, others are knobbed and dome-shaped. A few are curved or leaning and look like the teeth of a viper. In one area they are banded on the tips with a beard of brown soot, the way a magnet attracts iron filings, perhaps in response to a past halocline or an ancient sea level.

The rooms are vertically narrow and you thread your way through the fragile forest as carefully as you would swim

(Continued on Page 44)

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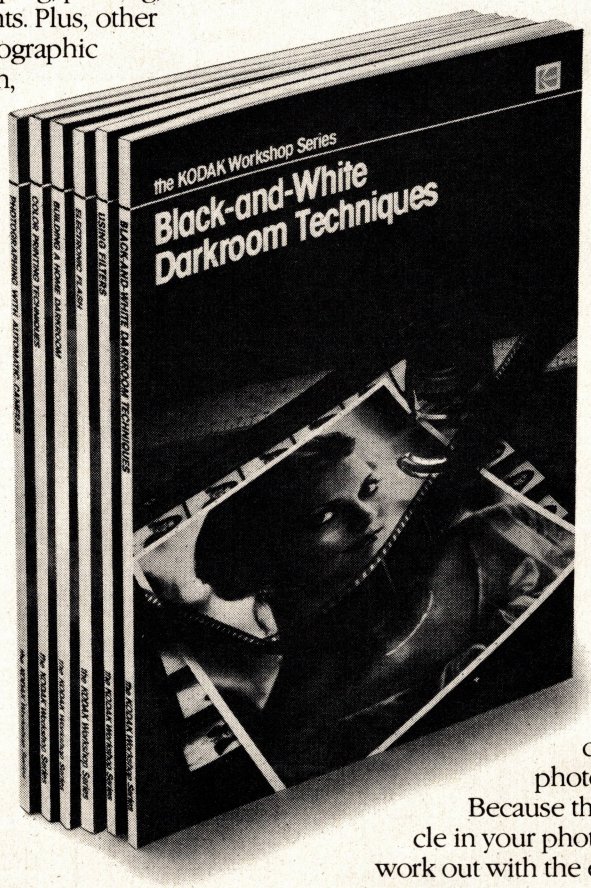

Building a Home Darkroom tells you how to plan, what you'll need, and where to locate. From planning to construction to electrical work to plumbing, this book shows the step-by-step completion of a prototype darkroom in photographs and easy-to-understand illustrations.

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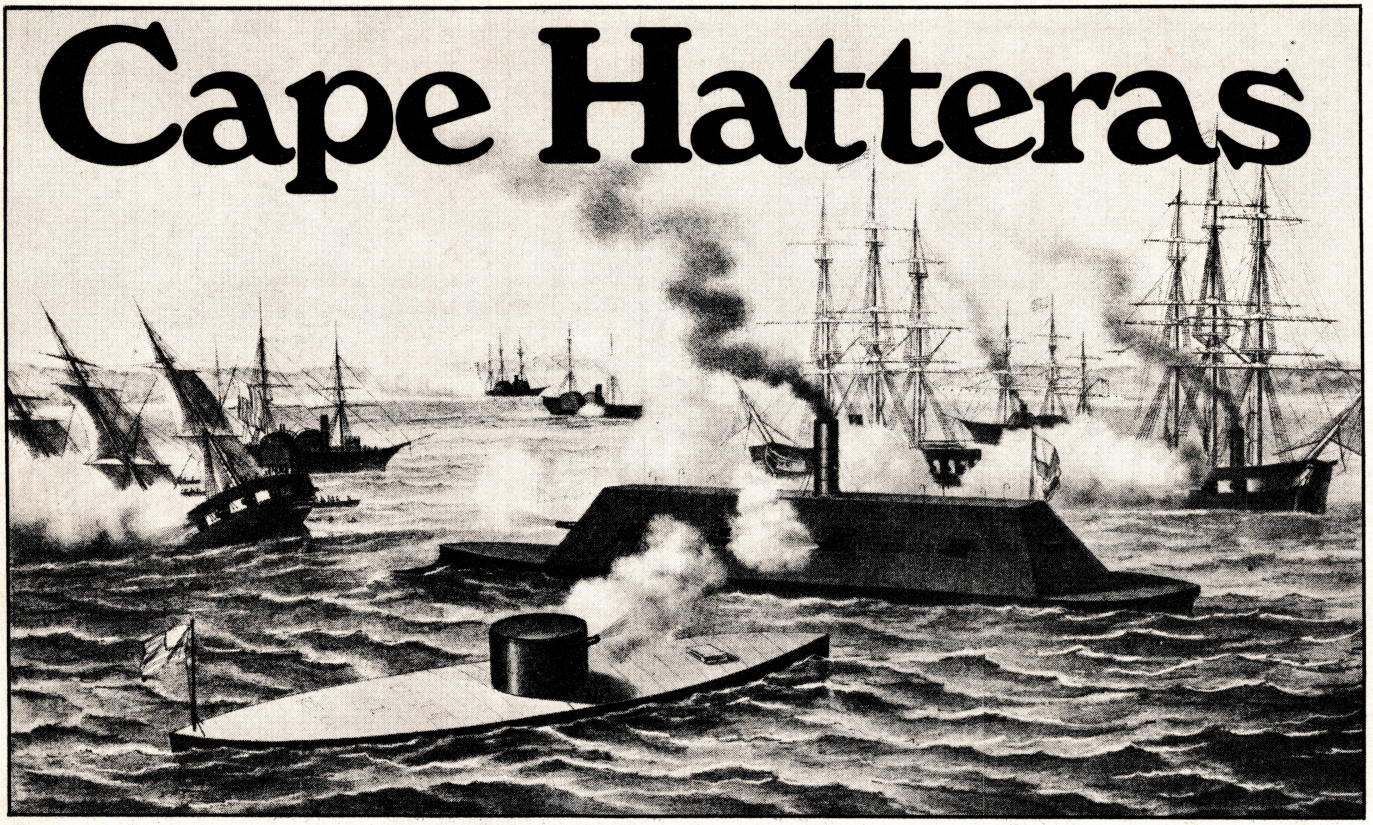
Cape Hatteras



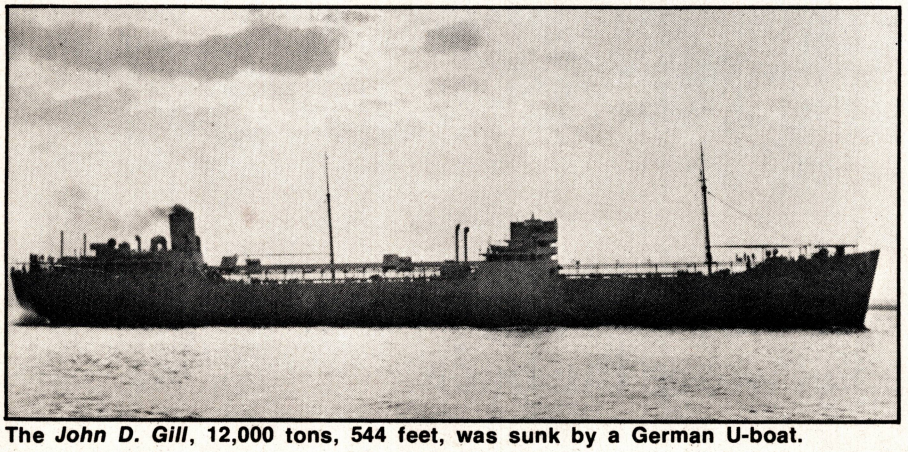
Over 2000 shipwrecks, buried in the cold embraces of a soluble tomb, comprise the morbid but enticing, "Graveyard of the Atlantic," North Carolina's claim to the finest diving on the East Coast of the United States.

Extending from Knotts Island on the north to Sunset Beach on the south, this 250 mile stretch of water continues to draw more divers every year. With bold names such as Cape Fear, Cape Lookout, Swash Inlet and Kill Devil Hills, the curving shoreline is broken by straits, sounds and bights, all miraculously guarded by the shifting sands of the perilous outer banks.

While the banks guard the inland areas, turnabout is not fair play for ships that venture close to their outer confines. Cape Hatteras, northernmost of the three Carolina capes, extends its shoal waters seaward into a junction where cold Labrador currents meet warm Gulf Stream eddies. You can stand on shore on a stormy day and watch 100 foot sprays spuming skyward, the result of the clashing currents and swirling tides. The shifting sands form Diamond Shoals, the infamous villain that sank hundreds of ships.

"Entrapment" is the word used by one shipwrecked captain who blames strong compass-deflecting, natural magnetic anomalies and sudden, ravaging storms for countless ships that met their Maker along this thin line of barrier islands. Many ships were lost before accurate records were kept, while other vessels went astray in the vicinity of the graveyard with no trace of ship or crew.

Early records indicate that European vessels were wrecked off the Carolina coast in the 16th century. One of the first was from the colonizing expedition of Lucas Vasques de Ayllon who set sail from Hispaniola in 1526 with three ships and 500 colonists. They were heading for the Spanish colony of Chircora, on what is now the Cape Fear River, when one of the brigantines ran aground. Efforts to free her failed and storms demolished the vessel. Thus the Spanish brigantine became one of the first recorded losses interred in the celebrated North Carolina burial grounds.



The *John D. Gill*, 12,000 tons, 544 feet, was sunk by a German U-boat.

SUBMARINES

Since the loss of de Allyon's ship, thousands of vessels have followed suit. Thousands of wrecks clustered over a 250 mile radius — most of them on shoals or in reasonably shallow water — create a wreck diver's paradise. Currently, the most popular are the World War II German subs, sunk off Nags Head, Cape Hatteras and Cape Lookout. One in particular, the *U-352*, is not only popular but controversial. (Read Saga of the U-352, SDM, November, 1981.)

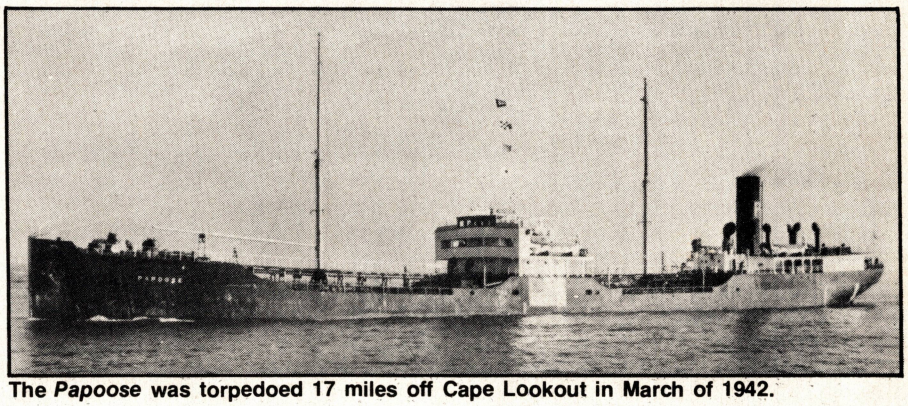
Wreck Diving Country

Cape Hatteras, home of the Monitor, is also the final resting place of 2000 ships

By Ellsworth Boyd

U-701 — This German U-boat was sunk in July, 1942, 16 miles SE of Cape Hatteras by Lt. Ray Kane, a U.S. Army pilot whose depth charges found their mark. German Commander, Horst Degen, was one of seven survivors who spent two days on a life raft before a Navy blimp rescued them. Six months ago, with the help of a German newspaper editor, Kane, now a resident of Kinston, NC, tracked down former Commander Degen in a small German town south of Hamburg. They have exchanged letters and plan to meet sometime in the future.

U-85 — This 220 foot hulk lies 100 feet down, 15 miles east of Oregon Inlet, south of Nags Head. Her deck guns, torpedo tubes and 88 mm shells are scattered about like toys used by kids when they play war. Only this was for real and the challenger lost. On a clear night, in April, 1942, the *U-85* fired a torpedo at the U.S. Navy destroyer, *Roper*. The torpedo missed, but the depth charges from the *Roper* hit home. There were no survivors. Dive clubs out of Nags Head visit the wreck several times each year to photograph and explore the instigator that became a victim in the Third Reich's futile attempt to conquer the world.



The *Papoose* was torpedoed 17 miles off Cape Lookout in March of 1942.

TANKERS AND FREIGHTERS

Eighty-seven vessels were lost along the North Carolina coast during World War II, 29 of them sunk by roving Nazi wolf-packs. Others struck mines, shoals or were lost in violent storms. Our ship losses were the worst in U.S. history, and would have been greater if we had not hastily developed effective anti-submarine weaponry.

Tankers and freighters were sitting ducks in the East Coast shipping lanes, especially at the beginning of the war when we had five sub-chasers, a handful of aircraft and an unconventional collection of assorted small craft that could act only as rescue vessels after a disaster. We didn't black out our coastal cities until we were three months into the war. By then, 50 large ships had been sunk on the East Coast by German U-boats. One of the first to go was the *Alan Jackson*, torpedoed off Cape Hatteras on January 18, 1942.

Alan Jackson — The 4000 ton tanker, transporting 72,000 barrels of crude oil from Columbia to New York, was cruising in calm seas at 1:30 am when she was hit by two torpedoes. One smashed into an empty cargo hold on the starboard side, causing little damage, but the other broke the ship in half when it struck near the bow, spilling crude oil everywhere. Some of the crew were trapped below decks, while others were swept into the sea. Captain Felix Kretchmer, trapped in his burning quarters, escaped through a porthole. Some of the men clung to drifting timbers, while others scrambled to the remains of a lifeboat. All faced three dangers: drowning, burning to death, or being sucked into the propeller which was still churning. Thirteen out of 35 survived, rescued by the U.S. destroyer, *Roe*. Sunk on the edge of the Gulf Stream, the *Alan Jackson* has never been found. She was one of 17 ships lost in January and February, 1942 in what newspapers hailed, "The Battle of Torpedo Junction."

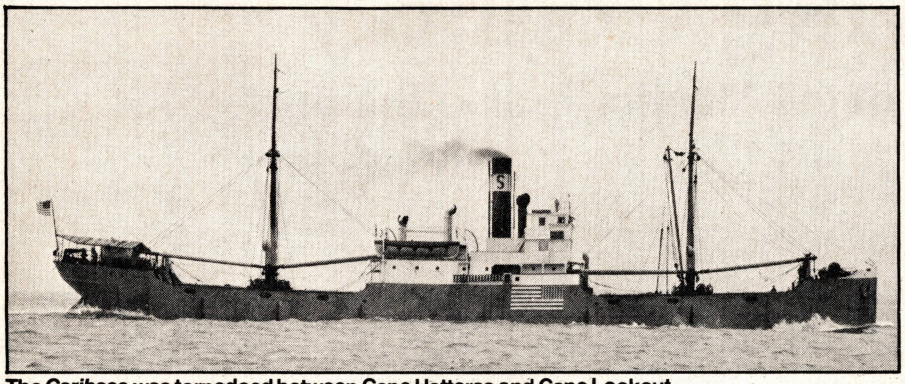
By March, the U-boats had organized into wolf-packs. The 220 foot, 500 ton marauders had four torpedo tubes forward, one aft, 14 torpedoes, plus deck guns. They were fueled for six weeks at sea. Night attacks were frequent, not only for the cover provided by darkness, but because the U.S. had not yet ordered a coastal blackout. The subs surfaced beyond the shipping lanes where they could see the unwary tankers and freighters silhouetted against the lights on shore. During March, until the blackout was ordered, U-boats sank an average of almost one ship daily.

Caribsea — One of the ships sunk in March was the American cargo vessel, *Caribsea*, now a popular dive site. Carrying a valuable cargo of maganese ore, the 251 foot Stockard Steamship Corporation lake freighter was sunk at night, southeast of the small town of Ocracoke, North Carolina between Capes Hatteras and Lookout. But her memory lives on today in the Ocracoke Methodist Church where a cross, made from the hickory nameplate of the *Caribsea* rests near the altar. The nameplate washed in not far from the maritime license of engineer James Gaskill, a native of Ocracoke, who was killed at sea.

Papoose and *W. E. Hutton* — A week later, March 18, 1942, Nazi U-boats hit the jackpot, sinking five ships in one night: the tankers *Papoose, W. E. Hutton, E. M. Clark*, and freighters *Liberator* and *Kassandra Louloudis*. The 5240 ton *Papoose* rolled over and sank after she was torpedoed amidships by the German sub, *U-124*. Some of the crew escaped and rowed to shore in the pale light cast by the flickering fires aboard the *W. E. Hutton*, also torpedoed by the *U-124*.

The *Papoose*, about 17 miles off Cape Lookout, is mostly intact, but leans so far to port she appears to be upside down. Her keel, the highest part of the wreck, is in 75 feet of water and her deeper lower decks have passageways accessible to experienced divers. The *W. E. Hutton*, about 16 miles from Cape Lookout, is in two separate patches, about 400 yards apart, in 60 feet of water. A year after she was torpedoed, the partially submerged hulk of the *Hutton* was struck by the *Suloide*, a small cargo vessel transporting maganese ore. The *Suloide* sank in 60 feet and the *Hutton*, a navigational hazard, was blown up.

The *U-124* was the most notorious and



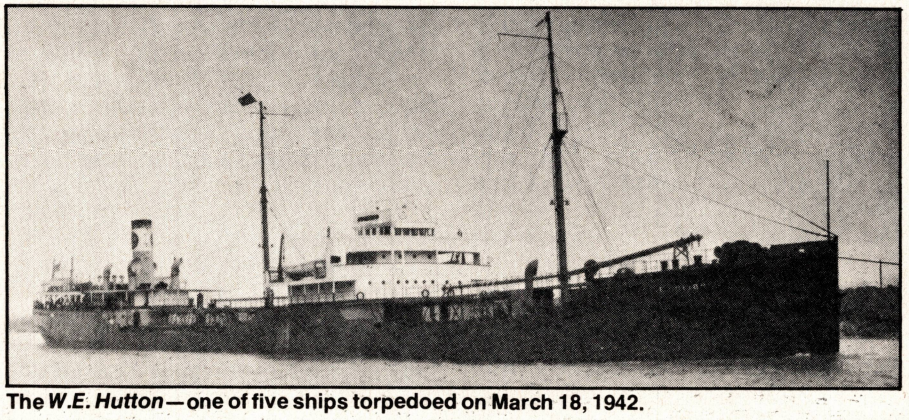
The *Caribsea* was torpedoed between Cape Hatteras and Cape Lookout.

devastating German U-boat in 1942. Her list of victims reads like a Who's Who in American and Allied shipping; she sank or damaged 63 vessels in a little more than one year. But she lived by the sword and died by it, paying the ultimate price for her carnage. Breathing fire and fury, the destroyers *H.M.S. Stonecrop* and *H.M.S. Black Swan* unleashed a barage of depth charges that would have sunk a battleship. The *U-124* never surfaced and there were no survivors.

Atlas — A 7137 ton tanker, sunk by the *U-552* on a three day spree, the *Atlas* is 120 feet down on the eastern side of Lookout Shoals, not far from the *Caribsea* The *Atlas*, an April 9, 1942 casualty, is dived more than the *Caribsea* because she is easier to locate, rising to within 80 feet of the surface. A Cape Lookout wreck, she is 27 miles from Beaufort Inlet.

John D. Gill — Wreck divers love the *John D. Gill* because she's overrun with all kinds of fish. One of the largest tankers sunk off the North Carolina coast, she was nearly 12,000 tons and almost brand spanking new. President Franklin D. Roosevelt presented the Merchant Marine Distinguished Service Medal to boatswain Edwin Cheny, for his actions during the sinking of the *John D. Gill*. Cheny launched a life raft and maneuvered it through a pool of burning oil by swimming underwater, towing the raft behind him. He surfaced with severe burns on his face and arms, but still managed to direct six of his shipmates to the raft. All were rescued later.

Twenty-four miles from the tip of Cape Fear, the *John D. Gill* is a 45 to 90 foot dive. Her main decks are 45 feet deep, while the bow — sitting upright as if the ship is underway — is 90 feet down at its base. The 544 foot ship is broken in half with its stern nearby. Bill Muney says that many divers miss one of the *Gill's* interesting features, a five inch stern gun. The gun deck is upside down in the sand with the gun underneath it, holding it up. You have to look closely to see it.



The *W.E. Hutton*— one of five ships torpedoed on March 18, 1942.

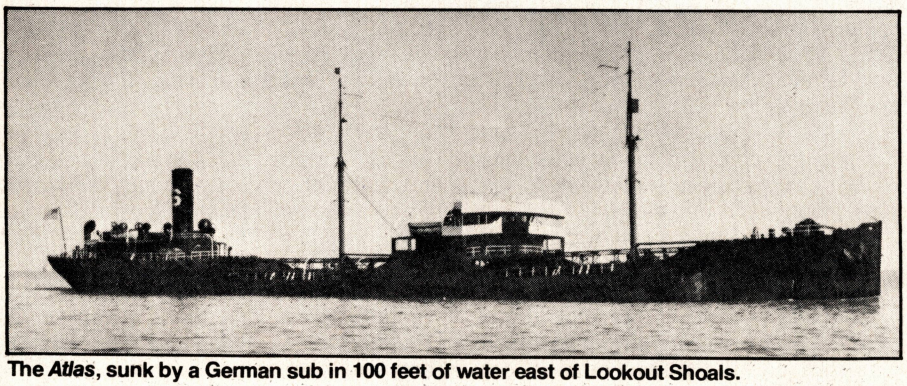
EARLY WRECKS

Blockade Runners — When President Lincoln proclaimed a blockade of Confederate ports during the Civil War, he launched the "spider and fly," "cat and mouse," war games — each ship hell-bent on outsmarting the other. Painted the color of a Hatteras fog in order to remain inconspicuous and burning smokeless anthracite, a long, low converted side-wheeler could lose herself against a wooded shoreline. Then, like a rabbit from the bush, she would make her final dash for a protected harbor.

Approximately 8000 round trips were made by a fleet of 1650 vessels, smuggling 600,000 small arms and tons of general stores into the Confederacy. But not all of them made it. Over 1000 blockade runners were captured or destroyed.

The *Modern Greece,* one of the largest vessels to attempt a run, was one of the first intercepted by Union ships in June, 1862 before she could reach Wilmington, the South's principal port for blockade runners. The captain beached her in the shallow waters near the Cape Fear River, then ordered her cargo unloaded. The crew removed some of the goods and guns, but the vessel went under with most of her supplies still aboard. U.S. Navy divers salvaged over 10,000 artifacts from the *Modern Greece* in 1963, including 1700 Enfield rifles, plus many bullets, mini-balls, knives, tools and tin ingots. Five years later, Dr. Charles Peery, head of Underwater Archaeological Associates, and fellow divers retrieved over 4000 additional items from the ship, wrecked in 25 feet of water, 1000 yards from shore.

Mike McCarley, owner of Wrightsville Beach Undersea Sales Shop, takes dive groups to blockade runners, usually sunk close to surf zones or near inlets. "There must be a dozen runners near shore," McCarley says. "They are exciting to dive because you never know what you might find." Divers should be aware of North Carolina's protective law, passed in 1967. It states that all historical



The *Atlas*, sunk by a German sub in 100 feet of water east of Lookout Shoals.

and archaeological material deposited on state-owned bottoms for more than 10 years becomes the property of the state. The North Carolina Division of Archives and History shoulders the responsibility for managing these resources. Scientific institutions and organizations can secure salvage and exploration contracts to conduct archaeological investigations on appropriate sites, while sport divers, with a hobby divers's permit, can recover small artifacts from the remains of the *Modern Greece.*

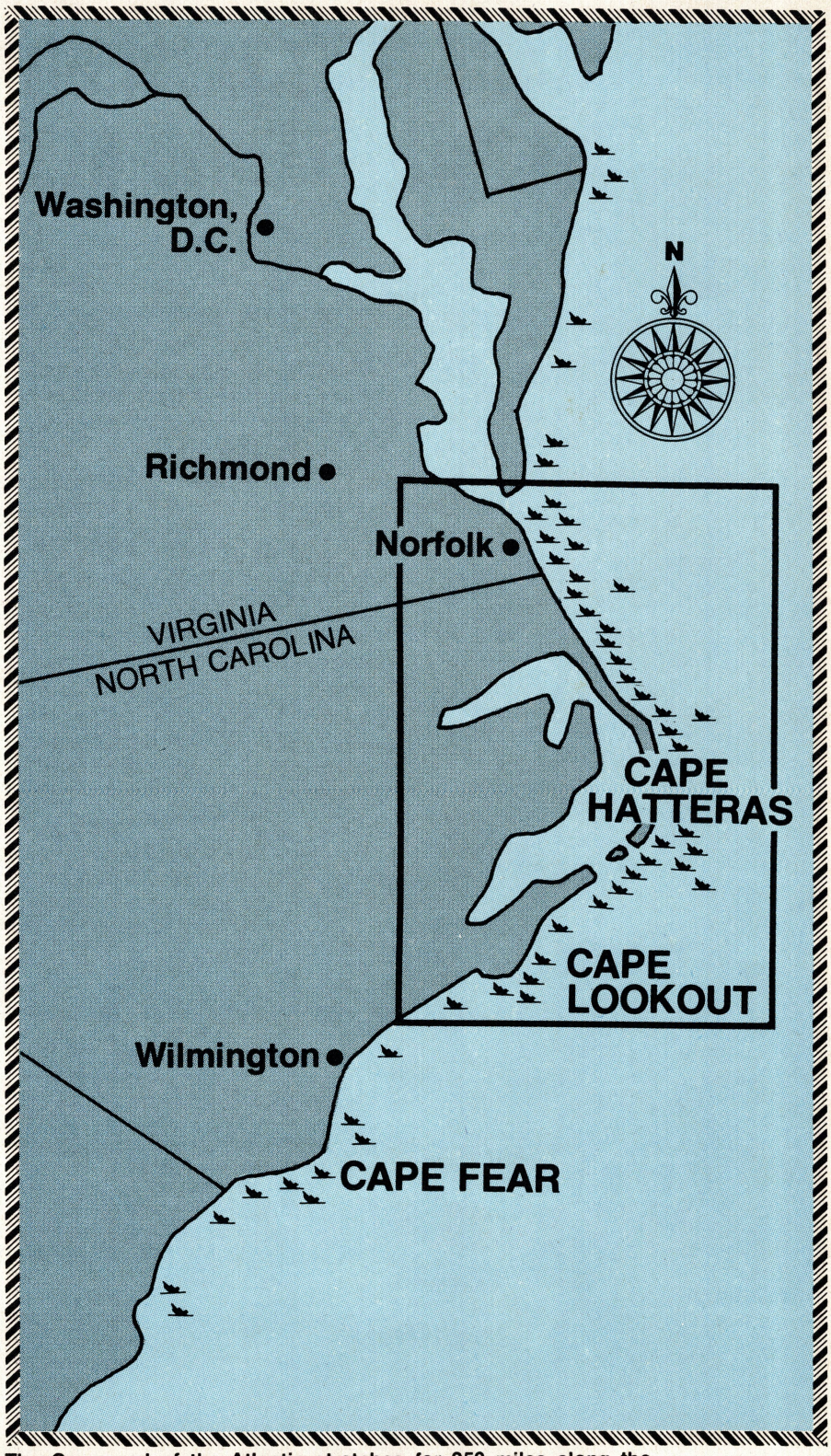
GUN BOATS

Louisana—In 1864, Union General B.F. Butler, in command of troops that planned to attack Fort Fisher — located between Carolina Beach and Cape Fear — devised a wild scheme. He filled the Federal gunboat, *Louisiana,* with 300 tons of gunpowder and had her towed in close to shore, opposite the fort. The resulting explosion was heard 20 miles away in Wilmington, but the only thing destroyed was the *Louisiana!* The fort was unscathed. Butler withdrew his troops and two weeks later a new commander arrived with more men and a larger fleet. In January, 1865, they captured the fort and sank the Confederate gunboat *Tallahassee.* Gunboats *Raleigh* and *North Carolina* were abandoned and sunk, the last remnants of the Confederate navy in North Carolina.

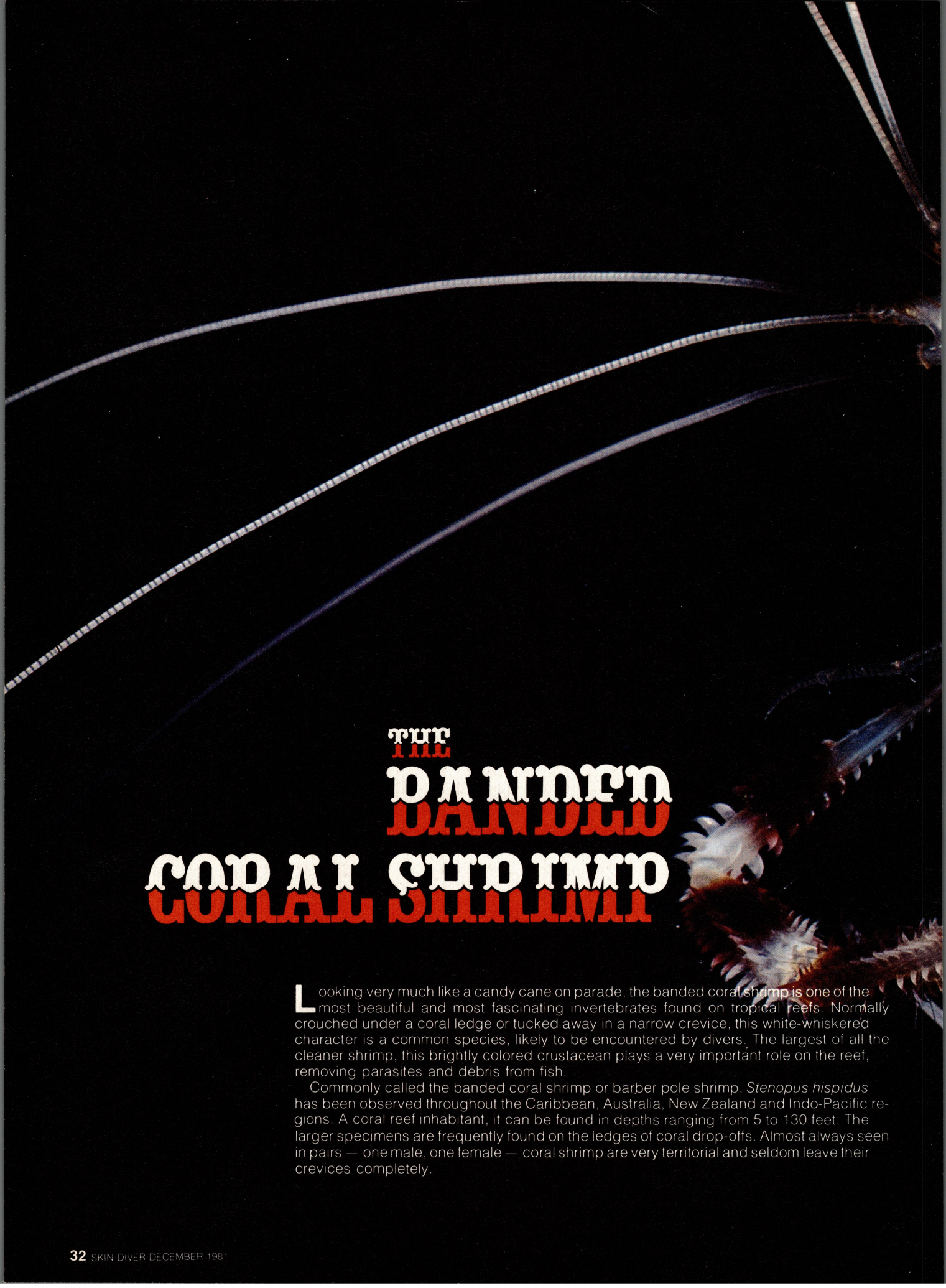
Gordon P. Watts, Jr., head of underwater archaeology for the North Carolina Division of Archives and History, and his diving team have found many early shipwrecks. Watts was a member of the 1973 expedition that discovered the *Monitor,* one of the most famous wrecks in the Graveyard of the Atlantic.

PEACE

People who will not venture out into the open sea pay the penalty of never having looked into the bright eyes of danger, and at best they know but half of life. The mariners who went down with their ships encountered life head-on and lived it to its fullest, blazing a path of glory before them. From the days of earliest New World explorations, they knew about the Graveyard of the Atlantic and held it in understandable awe. Some flaunted it, while others were frightened of it, yet they persisted in risking their vessels and lives in its treacherous waters. Some wanted to venture into the open sea, while others had no choice, as currents, winds, geography and economics brought them to the delicate barrier islands off the Carolina coast where their journey ended, suddenly and unexpectedly. Now, their path of glory leads to the silent depths — the Graveyard of the Atlantic, a quiet place wherein to sleep.



The Graveyard of the Atlantic stretches for 250 miles along the coasts of Virginia and North Carolina and contains the hazardous waters off Cape Hatteras, Cape Lookout and Cape Fear. The numerous wrecks in this area include sailing ships, Civil War gunboats, steamers and submarines.



THE BANDED CORAL SHRIMP

Looking very much like a candy cane on parade, the banded coral shrimp is one of the most beautiful and most fascinating invertebrates found on tropical reefs. Normally crouched under a coral ledge or tucked away in a narrow crevice, this white-whiskered character is a common species, likely to be encountered by divers. The largest of all the cleaner shrimp, this brightly colored crustacean plays a very important role on the reef, removing parasites and debris from fish.

Commonly called the banded coral shrimp or barber pole shrimp, *Stenopus hispidus* has been observed throughout the Caribbean, Australia, New Zealand and Indo-Pacific regions. A coral reef inhabitant, it can be found in depths ranging from 5 to 130 feet. The larger specimens are frequently found on the ledges of coral drop-offs. Almost always seen in pairs — one male, one female — coral shrimp are very territorial and seldom leave their crevices completely.

TEXT AND PHOTOGRAPHY BY GERI MURPHY

S. hispidus is a spiny shrimp with striking white antennae that are often as long or longer than the body itself. The body is a translucent white or cream color with broad bands of red. The claws are usually white with alternating bands of red and white along the arms. If a blue-green mass is found on the underside of the shrimp it is a female carrying eggs.

The banded coral shrimp spends most of its life hanging around a favorite coral head, attempting to attract fish in need of cleaning. By wiggling its long, white antennae, the shrimp advertises its location to prospective clients who wish to be groomed. The fish come up to the crevice and the shrimp uses its long, slender claws to pick parasites from their skin. In addition to fish parasites, the banded coral shrimp eats worms, algae and small shrimp.

U/W
Ship

Maintenance

Scrub-A-Dub-Dub Your Way To Big Bucks

By Charles Gordon

In the age of high energy costs, conservation and fuel efficiency have become crucial considerations for industries requiring large-scale fuel usage. This concern is nowhere more critical than among owners of ships and large boats, whether for commercial or pleasure use.

Compounding the already sizable fuel costs of moving large craft through the water, the constant growth of barnacles, algae and other fouling organisms on the ships' hulls decreases efficiency significantly, thus adding dramatically to operating expenses. Studies by the David W. Taylor Naval Ship Research and Development Center have shown that with normal fouling, approximately 15 percent more fuel is required to move a ship at normal speeds. For the shipping industry, this extra cost reaches enormous proportions. The U.S. Navy, for instance, estimates this figure at $150 million per year in added fuel costs.

Ship operators wage a constant battle to keep hulls clean and moving easily through the water. In large, steel-hulled ships, the primary measure to combat hull fouling is through the use of anti-fouling/anti-corrosive (AF/AC) paint. The paint system is a five layer application; three coats of epoxy anti-corrosive coating on the hull, followed by two layers of cuprous oxide vinyl, anti-fouling paint, toxic to fouling organisms.

Within only eight months of painting, however, the toxicity of the vinyl covering decreases and growth is allowed at a swift rate. This not only creates drag in the water (up to 25 percent more drag within 12-15 months of painting), but also can start corrosion problems, once the epoxy layers are penetrated. When this occurs, sea water begins to act on the unprotected hull.

Dry-docking, paint and out-of-service costs for large ships are enormous and many different techniques have been attempted to improve the life of the bottom protection. The most successful to date is regular hull cleaning by divers using various cleaning apparatus. While ships load or unload, divers can unobtrusively carry out effective hull cleaning procedures. The increasing need for this service has created a growing, lucrative field for divers the world over. Cleaning contracts worth millions of dollars annually are found in every major port; similar programs bringing in thousands of dollars are operated in pleasure-craft marinas as well.

For boats and ships of all sizes, the most utilized equipment is manufactured by Sub Enterprises in Irvine, California. It offers two types of units; the Brush Sub for large vessels and the Hydro Brush for smaller craft.

The Brush Sub is a one-diver operated, sled-like machine which, using a suction created by its three rapidly rotating cleaner brushes, crawls across a ship's hull, cleaning as it goes. An 85 or 130 hp diesel engine powers a hydraulic pump, which is connected to the Brush Sub by a 300 foot coaxial hose. The unit can clean a four foot wide strip at a rate of 135 feet per minute. This means that even the largest tanker can be cleaned in 8-12 hours.

The technique is simple. A workboat moors alongside the vessel to be cleaned. The Brush Sub is lowered into the water, attached to the compressor by the coaxial hose. The diver positions the positively buoyant machine against the ship's hull, and, lying prone across the top, begins operation. The stainless steel brushes clean completely, revolving at 1200 rpm. Guided by a handlebar steering mechanism, the Brush Sub is nimble, and will turn in its tracks.

For smaller vessels, such as pleasure craft in the 40 foot and over range, the Hydro Brush is an easy-to-use cleaning tool. Diver operated, the hydraulically-powered rotating brush cleans 200-400 meters per hour. Hand-held, this positively buoyant apparatus is moved along the hull, cleaning with very little effort. The diver may wear scuba tanks or use hookha.

With the advent of such efficient, low-maintenance systems, the ease of entering the high-income hull maintenance business has been greatly increased. Two persons (a diver and a surface assistant) equipped only with a cleaner unit, a compressor, a 14 to 18 foot boat and a van or car trailer (to transport equipment) can successfully begin earning big money in this growing field. Larger, commercial operations will add crew members for increased efficiency.

Once the initial investment for the equipment is made, ongoing expenses are low. The business will need little more than an answering service, liability insurance, and business license(s) to operate successfully. (Of course, legal and accounting help are extremely valuable to any business.) Despite the low operating costs, rates charged to customers are lucrative. Typical charges for normal cleaning would be: 40-100 foot vessel — $6-8 per foot; 100-200 foot vessel — $6-10 per foot; 200-400 foot vessel — $8-14 per foot; 400-500 foot vessel — $12-24 per foot.

Cleaning a 500 foot ship with 42 foot draft (8-12 hours work with the Brush Sub) would bring in about $8,000.

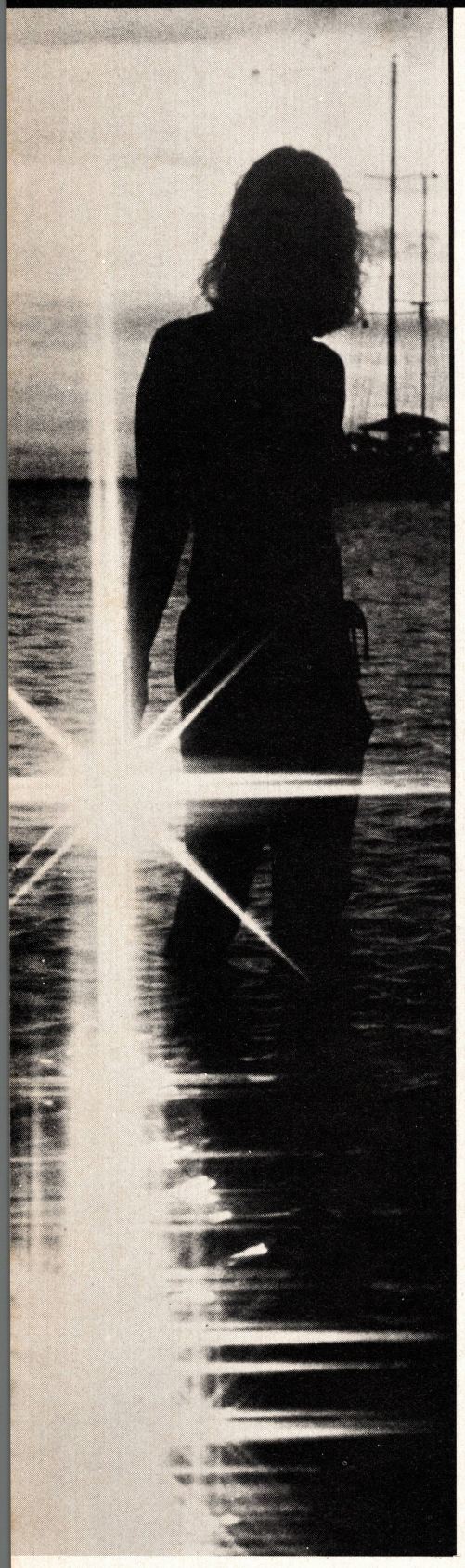
For many divers, the opportunity to become involved full-time in the underwater world has remained an unfulfilled dream. For persons wishing to investigate this interesting endeavor, a complete information booklet detailing start-up requirements, operating procedures, financial considerations, and promotional ideas is available at no charge from Sub Enterprises, Inc., 17865 Sky Park Circle, #18K, Irvine, CA 92714; (714) 540-9455.

photo/courtesy Sub Enterprises

The hydraulically-powered Hydro Brush can clean a ship's hull at 400 meters per hour.

photo/Bonnie Charles

WHICH IKELITE



There are obviously several superb IKELITE LITES you might consider. Some offer dual beams, rechargeable models, small size, or unmatched intensity — exciting features that can broaden your diving experience. But only you know the features you really need. See these LITES for yourself at the IKELITE dealer nearest you, then savor the experience of being unable to make a bad choice.

IKELITE II

Simplicity of design, trouble free performance and long life best describe the IKELITE II. It features a unique ON/OFF switch and lock, a #4546 sealed beam bulb powered by a standard 6 volt lantern battery, (not included). Unquestionably the brightest and most dependable diving light in its price range. Lite is available in black, white and clear.

IKELITE II RECHARGEABLE

A rechargeable lite in the mid-price range. This new lite offers the same features as the standard IKELITE II, plus a rechargeable gel-cell battery and charger. The gel-cell battery powers a special #4645 sealed beam lamp, producing four times the intensity of lantern battery lights. The gel-cell battery provides a constant intensity for approximately 2 hours on full charge and recharges in 10 to 15 hours. Lite is available in black or clear.

MINI C-LITE I

The MINI C-LITE I features compact size (5" long by 3" diameter), a virtually indestructable case, unmatched intensity, and easy one hand ON/OFF control. Designed to operate with 4 "C" cell alkaline batteries (not included) and a standard flashlight bulb. This combination provides 4 to 6 hours of light with twice the intensity and coverage of similar size lights. The lite's size and optional rubber holster (#1056) offer unlimited mounting applications. Lite is available in black, clear or orange.

MINI C-LITE II RECHARGEABLE

This new lite offers the same features as the MINI C-LITE I, plus 4 "C" cell nickel-cadmium batteries and charger. The ni-cad batteries provide a constant intensity for approximately 2 hours on a full charge and recharge in 12 to 16 hours. Optional rubber holster (#1056) also available.

C-LITE I

The unique shape of these lites offers easy one hand operation, or they can be carried on dives in the optional (#1055) C-LITE HOLSTER. The C-LITE I offers 50% greater intensity than lantern battery powered lights. The sealed beam bulb operates from 6 "C" cell alkaline batteries (not included) and produces 10,000 initial candle power as compared to 6,000 candle power produced from standard lantern battery powered lights.

C-LITE II

One of the brightest rechargeable lights in the diving industry. This lite comes complete with ni-cad batteries, charger and halogen bulb. The special ni-cad batteries provide approximately 1½ hours of constant intensity between charges. Lite fits optional (#1055) C-LITE HOLSTER.

MODULAR I LITE

This lite utilizes six inexpensive "D" cell flashlight batteries (not included) to provide intensity unequalled by any popular priced diving light. Lite can be converted to Modular X, SuperLite or MovieLite. Available in black or clear.

MODULAR X LITE

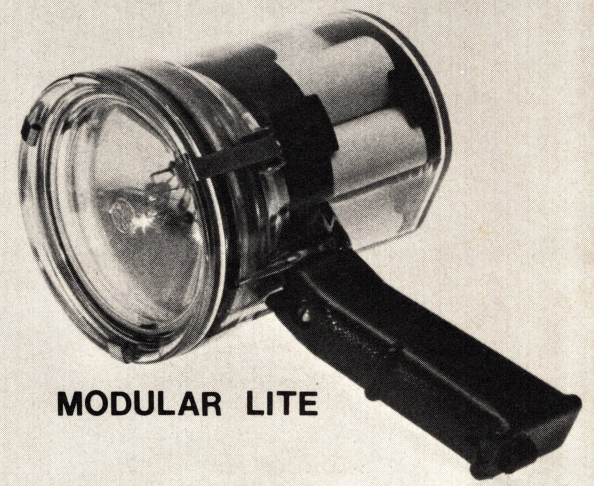
This lite utilizes a more powerful bulb which requires six alkaline "D" cell batteries. This combination produces an intensity almost equal to rechargeable lights in the $100 price range. Lite can be converted to SuperLite or MovieLite. Available in black or clear.

MODULAR SUPERLITE

Unquestionably the world's brightest diving light. A dual filament bulb provides spot or flood lighting. The spot beam provides approximately one hour of intensity equal to a 100 watt aircraft landing light; the flood beam provides approximately two hours of lower intensity. Powered by rechargeable ni-cad pack engineered specifically for this lite. Ni-cad packs interchange in a matter of seconds. An optional 15 hour or 3 hour charger is available. Converts to MovieLite. Available in black or clear.

IS THE BEST ?

IKELITE II



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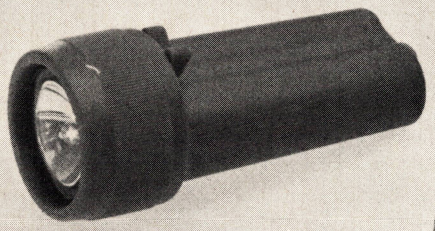

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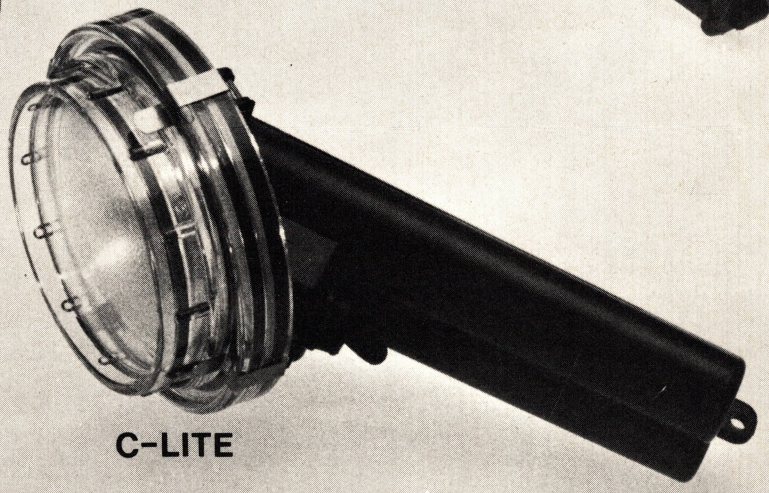

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1980 NOGI AWARDS

By Bonnie J. Cardone

Once again diving honors its own. Every year since 1960, the Underwater Society of America has awarded the NOGI to four people who have made outstanding contributions to some aspect of diving. There have been 84 so honored now and the list of their names can be considered the who's who of scuba. These people have entertained, educated, equipped, prepared and protected us: And, diving has greatly benefited from their efforts. The 1980 NOGI Awards, co-sponsored by SKIN DIVER, will be presented to: Valerie Taylor, Dr. Peter Bennett, Lou Fead and Harry Shanks.

VALERIE TAYLOR/ARTS

An underwater photo/journalist, Valerie Heighes Taylor has the distinction of being nibbled on by more sharks than any other man or woman alive. The movie, *Blue Water, White Death,* first brought the world's attention to two things: The great white shark and Valerie Taylor's lack of fear. In the film she is seen, pink ribbons distinctly denoting her person, perpetually bobbing among the sharks.

Valerie is only the fifth woman ever chosen for a NOGI (the others were Eugenie Clark, Sylvia Earle, Mary Edith Lillis and Zale Parry Neuman) and the first woman whose husband has also been so honored. (Ron Taylor received his NOGI for Sports/Education in 1966.)

A native of Australia, Valerie became a scuba diver more than 20 years ago. She was an avid spearfisherman at first, as was Ron. Eventually they both exchanged their weapons for cameras and began photographing fish instead of spearing them. Married in 1964, the Taylors have had a very productive partnership. Valerie is often in the thick of the action while Ron handles the camera. They have also teamed up to do special footage for movies such as the *Blue Lagoon* and *For Your Eyes Only*.

Valerie's articles and photographs have appeared in National Geographic, SKIN DIVER, Time/Life Books and various other publications.

PETER BENNETT/SCIENCE

A well-known, respected scientist, Dr. Peter Bennett has been involved in dive physiology research since 1953, but he became a diver less than 10 years ago.

Born and educated in England, Dr. Bennett lived in India for several years as a child and, later, spent two years in Germany with the RAF. He received his B.S. degree from the University of London and his Ph.D. from the University of Southampton. He got into dive physiology rather casually. His father, a civilian engineer who worked for the Navy, learned that the Royal Naval Physiological Laboratory had an opening in the department doing research on underwater blast problems. Dr. Bennett applied for and got the job. His association with the lab lasted 19 years, during which time he researched not only protection from, and the physiology of, underwater blasts, but

also compressed air intoxication, oxygen toxicity, decompression sickness and high pressure nervous syndrome (HPNS). During this time he made simulated dives in chambers but did no recreational diving at all. Through his work, however, he got to know many divers, mostly members of the British SubAqua Club. His interest in scuba, he says, "grew along with the work." He enjoyed vacation trips to tropical waters and finally took a scuba certification course when Caribbean resorts refused to let him dive without a C-card.

At present, Dr. Bennett is director of the F. G. Hall Laboratory of Environmental Research, Professor of Anesthesiology and Associate Professor of Physi-

photo/Stacy A. Trighe

Peter Bennett

ology at Duke University Medical Center, Durham, NC. He is also a charter member and former president of the Undersea Medical Society. In 1975, he received the first Oceaneering International Award for outstanding contributions to the advancement of commercial diving.

Dr. Bennett moved to the U.S. in 1972 with his wife and two children. Most recently, he has been experimenting with Trimix (Helium, Oxygen and Nitrogen mixtures) in an attempt to prevent HPNS. He is the director of the Atlantis series of deep dives which reached a world record simulated depth of 2250 feet this year. (SDM August, 1981, page 106.)

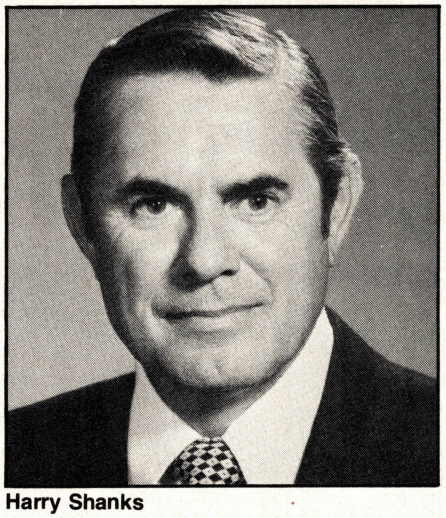
HARRY SHANKS/ DISTINGUISHED SERVICE

There is at least one tireless worker in back of each successful organization. Harry Shanks is such a person. The organization he founded and still works hard to support and promote is Our World—Underwater. The largest symposium of its kind in the U.S., it has been held in Chicago each year for ten years. It has given a $5,000 scholarship for eight of these years to one young diver whose future seems likely to reward diving.

Harry was born in Chicago and attended both Wabash College in Indiana and St. Mary's College in Marega, CA. He served in both the Navy and the Air Force. He started diving 20 years ago and has logged over 1500 dives in various parts of the U.S. as well as the Bahamas, Mexico, Jamaica, Spain and Italy.

In 1974, Harry was asked to plan a strategy to help overturn the Los Angeles County Ordinance that threatened to stifle scuba diving in Southern California. He formed the National Scuba Advisory

Valerie Taylor



Harry Shanks

Board, which helped defeat the most damaging aspects of the ordinance.

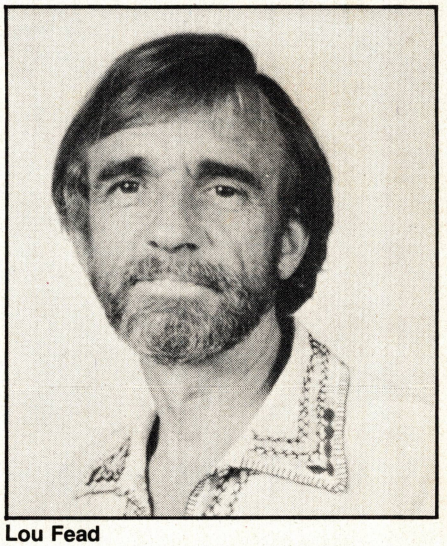
In 1970, Harry helped found the Our World—Underwater program. He was and still is its director and chairman. He has served many other scuba organizations as well, including: the Underwater Society of America, the YMCA Metropolitan Council, the Illinois Council of Scuba Clubs and the U/W Adventurers Club.

Harry began working for Sears, Roebuck and Company in Chicago the same year he got married. His association with the company has been as long and as fruitful as his marriage, which has lasted 32 years and produced seven children.

LOU FEAD/SPORTS/ EDUCATION

"Dive with your brains, not your back," is the message of Lou Fead's *Easy Diver*. Published in 1977, the book was designed to encourage divers to take it easy and enjoy diving, "to work with the water instead of against it."

Now chief instructor of the Underwater Explorers Society (UNEXSO) in Freeport, Grand Bahama Island, Lou began diving in 1966. By 1969, he was a NAUI instructor, teaching scuba courses for the Diving Locker. After five and one-half years with the San Diego, CA dive store, he decided to go into business for himself. Known as Waterlou Enterprises, Lou was a dive industry consultant: writing and in-



Lou Fead

structing as well as developing, testing and evaluating dive equipment. His dive gear inventions include a snorkel, instrument caddy, travel spear and a magnifying lens that mounts on a facemask. His articles have appeared in many dive publications, including SKIN DIVER, Undercurrent, NAUI News. He also edited the San Diego Diver's Log for a year.

Like most divers, Lou has a water-oriented background. He graduated from the U.S. Naval Academy with a B.S. in engineering and was a U.S. Naval officer for eight years, serving on an aircraft carrier as well as on submarines. After the Navy, he was an engineer in the nuclear power industry. In 1965, he was the Pilot and Operations Manager for a fleet of two-man research submarines owned by General Dynamics. He piloted these in the North Sea, the Atlantic and Pacific Oceans and in Lake Michigan until the fleet was disbanded in 1969.

A NAUI board of directors member, Lou served as program chairman for three consecutive IQ's and edited the *Proceedings* of IQ 7. He is co-chairman of the Z86.61 Task Group on Underwater Communications for the American National Standards Institution.

70 miles of coastline plus offshore islands provide unlimited diving adventures

San Diego

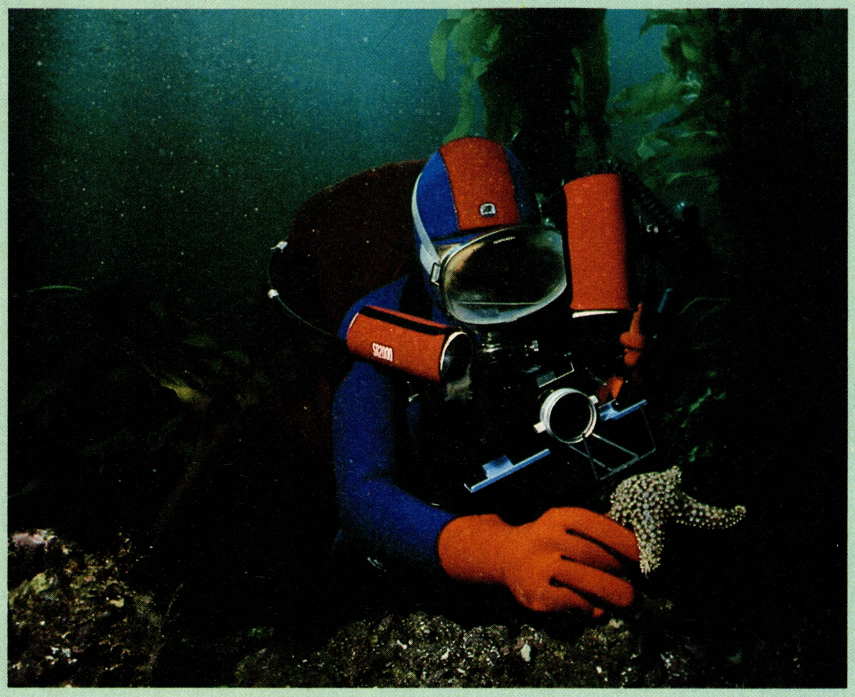
Text and photography by Marty Snyderman

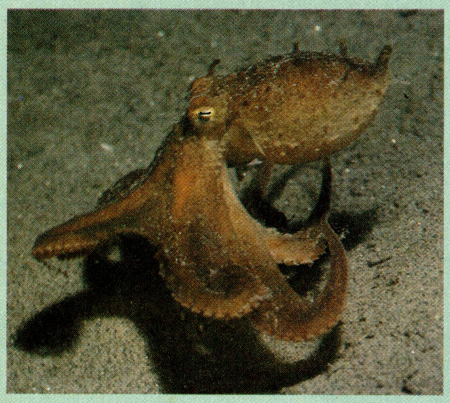
The citizens of San Diego proudly refer to their home as America's Finest City. I, too, am a San Diegan, and like so many of my neighbors I am spoiled by our near perfect weather and the laid-back lifestyle. In San Diego, we enjoy a blend of Mexican and American folklore, the cultural advantages of living in a big city, major league athletic teams and spending our days at our world-famous Zoo, Sea World, Balboa Park and the beach. But for me and for hundreds of other San Diego divers, the best part of living here is that our town borders one of the last true frontiers on earth. And I do mean borders! The distance from some people's homes to this frontier is only a matter of yards, not miles. I am, of course, referring to the marine wilderness of the Southern California Pacific Ocean. Diving less than one-fourth mile off the coast of San Diego, I have seen almost everything from inch long, rainbow colored nudibranchs to 30 foot long gray whales.

Variety is a highlight of our local diving. Whether you desire beach diving, boat diving, a chance to catch your dinner, or access to the nearby Coronado or Channel Islands, San Diego diving offers it all. And once underwater, you can enjoy adventure filled swims in environments that vary from beautiful kelp forests to the sandy bottom of the La Jolla submarine canyon. We have over 70 miles of coastline in San Diego County and there are literally dozens of great dive sites. Beach diving is excellent in many areas and while boats are certainly nice to have, they are not necessary.

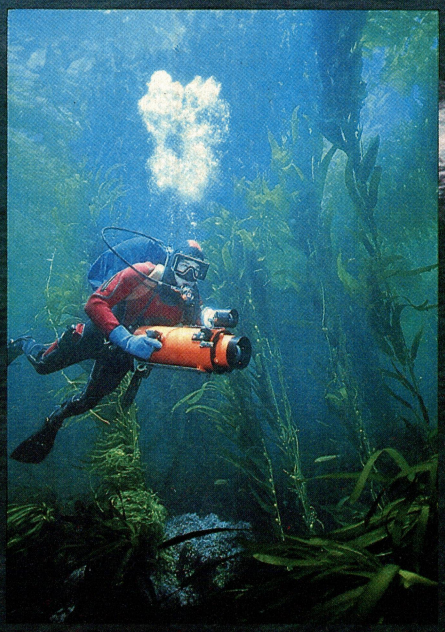
Diving in La Jolla is as easy as anywhere in Southern California. The best spots, Wind and Sea beach, Casa Cove, and of course, La Jolla Cove (The Cove as locals call it), all have excellent beach access and short swims to the kelp beds. Typical marine life is the main attraction in these areas and divers can expect to see garibaldi, blacksmith, perch and numerous rockfish as well as occasional schools of yellowtail and Pacific barracuda. The kelp provides beautiful foregrounds and backgrounds for all types of photography. The gorgonian covered rocky reefs are filled with gobies, blennies, shrimp, lobster, starfish, octopus and nudibranchs. The entire La Jolla area, especially the anemone covered walls of Casa Cove, is a macro photographer's paradise on days when the water is relatively flat. The Rock Pile, one of the better spots within The Cove, often provides divers with several moray eels that can be hand fed by those who so desire. Average dive depths in all of these areas are 45 feet or less, so bottom time is rarely a problem. If you want to take a break between dives, there are a number of grassy parks where you can picnic, play volleyball, or bask in the Southern California sun.

While the more typical kelp forest life is easily enough to make diving in La Jolla well worthwhile, I must add that on two dives I have looked up to see not-so-typical gray whales looking back at me. Howard Hall, Fred



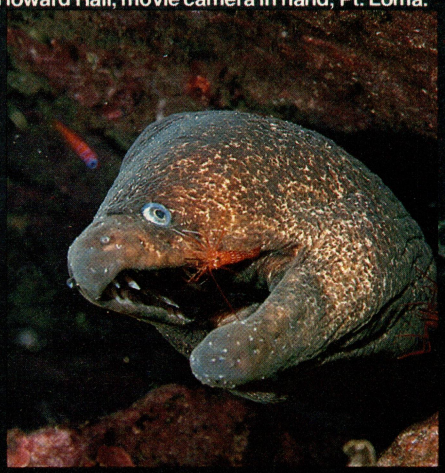


Above, Barbara Harland positions a starfish for a close-up shot in the kelp forest at Seaside. Right, an octopus dances across the sandy bottom of La Jolla's submarine canyon. The coastline of San Diego County runs for over 70 miles and includes a wide variety of great dive sites.



Howard Hall, movie camera in hand, Pt. Loma.

A copper rockfish in La Jolla's underwater canyon.



A moray and cleaner shrimp. La Jolla Cove.

Gopher rockfish (genus *Sebastes)* are common to San Diego.

Fischer and Dave Slidders enjoyed those experiences with me. To be in the water with a mammal whose length approaches 30 feet, whose mere presence causes the entire ocean to look dark, and whose weight is usually expressed in tons, not pounds, is an experience not easily forgotten. And on numerous dives in the La Jolla area I have enjoyed the thrill of swimming with California sea lions. These mammals appear to be much more curious about divers than whales are. Sea lions often buzz in and out of groups of divers, swimming within touching distance only to dart away just when you reach out to them. Just as suddenly they will reappear, putting on a show in underwater acrobatics that is rarely equalled. And all of this occurs less than one-eighth mile from the shore of La Jolla, one of the fanciest and busiest areas within our city.

The Cove, however, is part of a game reserve. So if it is dinner you are after, it is best to try another area. Many commercial fishermen are trying to abolish the reserve status of The Cove in order to exploit fish, lobster and abalone populations. Most sport divers, on the other hand, believe that it would truly be a great loss to the dive community if The Cove were opened to commercial efforts.

Game is abundant in other places and the kelp beds of Pt. Loma and North County are full of the local favorites — abalone, lobster, scallops and sheephead. Occasionally yellowtail, white sea bass, black sea bass, and more often, good sized halibut, are also taken. Some San Diegans regularly beach dive from Sunset Cliffs in Pt. Loma, but a strong pair of legs and a good back are needed for the hike to the beach. The surf line can then be long and tricky, and the swim to the kelp can easily take 20 minutes. However, a meal of abalone chowder or seafood shish kebab is often the reward for such efforts. Abalone irons, lobster gauges and a California fishing license are required, and all can be acquired at any of the area's eight dive shops for a nominal fee.

Most divers I know prefer to dive Pt. Loma by boat because the area is so large. While the inside kelp can be reached from the beach, the outside drop-offs are more accessible by boat. Many of the deep water walls are covered with brightly colored *Corynactis* anemones and more often than not you can find crevices filled with large red abs and rock scallops. The vertical reefs at New Hope Rock are a favorite of many locals and the spot is commonly visited by charter boats.

Throughout Pt. Loma, the kelp forests are especially thick and healthy providing an excellent base for the entire ecosystem. Visibility at times approaches 60 feet with the average being closer to 20.

North County enthusiasts associate the names Seaside, Tamarack, Beacons, Cherry Hill and Moonlight with the memories of good times spent swimming through a kelp forest taking pictures and chasing dinner. Beach access is good in many North County locations. At Seaside, San Elijo State Beach and Moonlight, divers can be wet only a few minutes after parking their cars and observing surf conditions. On exceptionally flat days the fun begins just beyond the surf line in less than 15 feet of water. At Seaside, Bob Schaible and I have, on those special days, been surrounded by garibaldi before our fins touched bottom. It is hard to ask for more beautiful scenery than the palm kelp, eel grass and reefs in the shallow water only a few yards offshore.

However, water conditions often necessitate a little longer swim to get away from the surf and surge. These swims (in places such as 15th Street in Del Mar) put divers into kelp beds that are not dived nearly as often as those in La Jolla. Game is much more plentiful in many of these less pressured areas.

For something a little different, an excellent spot to try is the submarine canyon off La Jolla Shores. Many San Diegans know The Shores as the place where instructors teach their classes and they think of the area as rather boring. There is no kelp and the bottom is sandy and flat, having only a gradual slope until it reaches a depth of about 30 feet, but then, look out! A series of steep sand and clay ledges cascade down several hundred feet or more. Nutrient rich upwellings attract a lot of marine life to the canyon and much of it is quite different from that typically seen in the nearby kelp beds. A large percentage of the creatures that inhabit the canyon are nocturnal, and while the sandy bottom can seem to be void of life during the day there is an explosion of life to be witnessed at night. Then, the bottom is alive with octopuses, sarcastic fringeheads, rockfish, crabs, heart urchins and more. The octopuses in the canyon are small, only about ten inches long, but they can change colors as fast as you can blink an eye. One moment they are dark brown, the next they are strawberry red and just as suddenly they become a mottled sandy color blending in with the bottom.

Sometimes thousands of squid spawn in the canyon. Their activity attracts big black sea bass, white sea bass, bat rays, guitarfish, angel sharks, horn sharks, a few blue sharks, and more. During squid runs, the sandy bottom is transformed into a shag carpet of egg casings that at times totally occlude the bottom. The Shores is part of the game reserve that contains La Jolla Cove, but the marine life observed in the two areas is often very different.

Not only is San Diego diving exciting but excellent access makes our water easy to enjoy. Trailerable boats can be launched at Pt. Loma, Mission Bay, La Jolla and in North County. All that is needed is a CF number. A boat will enable you to dive anywhere in Pt. Loma, on the outside of the La Jolla kelp bed, and in the northern part of the submarine canyon off Black's Beach. The top of the North Canyon wall is at least 80 feet deep but it is especially scenic as a multitude of red and gold gorgonians cover the sheer walls. And too, most of North County is more easily dived by boat.

If you do not have your own boat but still want to go boat diving, that can easily be arranged. All you need to do is call the Diving Locker, New England Divers, Ocean Enterprises or San Diego Divers Supply and they will gladly make the arrangements for you. The local charter dive boat fleet consists of the *Bottom Scratcher, Hustler, Horizon* and *Sand Dollar*. These boats regularly visit Pt. Loma, La Jolla, the Coronado Islands and San Clemente Island.

I could go on and on about San Diego diving, both the adventures enjoyed and the community of people that make it all so interesting. I haven't said anything about all the marine research being done here, or about local dive clubs and their activities, or about the group of up and coming filmmakers. But I could never really say all there is to say, so I'll finish with this; If you want to be spoiled rotten, try living and diving in San Diego!

DIVE SHOPS

New England Divers
3860 Rosecrans
San Diego, CA 92110
(714) 298-0531

Diving Locker
1020 Grand Avenue
San Diego, CA 92109
(714) 272-1120

Ocean Enterprises
4646 Convoy
San Diego, CA 92111
(714) 565-6054

Diving Locker
1148 Delevan Drive
San Diego, CA 92102
(714) 231-8331

San Diego Divers Supply
4004 Sports Arena Blvd.
San Diego, CA 92110
(714) 224-3439

Diving Locker
405 North Highway 101
Solana Beach, CA 92025
(714) 755-6822

San Diego Divers Supply
7522 La Jolla Blvd.
San Diego, CA 92037
(714) 459-2691

Diving Locker
348 East Grand
Escondido, CA 92025
(714) 746-8980

CHARTER BOATS

Hustler
(Skipper Dick Howard)
2838 Garrison
San Diego, CA 92106
(714) 223-9729 or 222-0393

Horizon
(Skipper Lou Grivetto)
4178 Loch Lomond
San Diego, CA 92111
(714) 277-7823

Bottom Scratcher/Sand Dollar
(Skipper Bill Johnston)
P.O. Box 6374
San Diego, CA 92106
(714) 224-4997

CLUBS

San Diego Council of Divers, Inc.
P.O. Box 9259
San Diego, CA 92109

Underwater Photographic Society
P.O. Box 82782
San Diego, CA 92138

WATER AND DIVE CONDITIONS REPORT

City Lifeguards
(714) 224-2708

Diving Locker
(714) 239-DIVE

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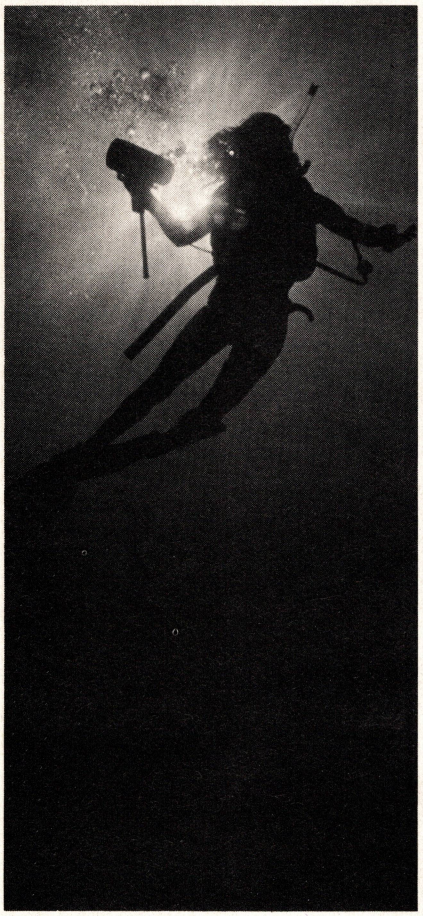

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FREEPORT CAVERNS

(Continued from Page 26)

through the mouth of a dragon. Inside the chamber known as the Wedding Hall is a cascading flowstone terrace the shape and size of a wedding cake, complete with bride and groom attached. Along the way are small alcoves with intricate rimstone terraces and clusters of small stalactites that look like cows' udders.

Bahamasair flies 737 jets to the Bahamas from Miami, Ft. Lauderdale and Atlanta.

There are many other fairy-tale exhibits located along the nearly 25,000 feet of permanent line installed in the complex. In the South Room there is a curious little formation called the Madonna and Child, a helictite that seems to defy gravity. In Ancient Alley divers can see fossil star, elkhorn and staghorn corals embedded in the rocks. Also notable is the tortuous Bed of Nails, a field of needle-shaped stalagmites in the Crystal Room.

In six days we saw most everything the Lucayan Caverns have to offer. UNEXSO's cave course is a fast-paced professional program taught by a caring instructor using state-of-the-art equipment. In addition to the most beautiful cave diving in the world, I learned what I needed to know to safely enjoy the sport. When confronted by a network of dark corridors in a cave even the bravest soul will feel a slight chill. After 15 years of diving I was surprised by the intensity of the experience and the realization that some anxiety is usually close at hand. Without the proper equipment and training and without a professional guide, a sport diver in a cave is vulnerable and out of place. Non-cave certified divers are also ignorant about the cave environment itself. Limestone caves and their decorations are extremely fragile, delicate structures. Vandalism, souvenir collection and careless dive techniques are mindless activities that cannot be tolerated. If we play the game we must follow the rules, but it's a small price to pay to visit those cathedrals of graceful splendor in the world of perpetual midnight.

For information on equipment, schedules and fees write: UNEXSO, P.O. Box F-2433, Freeport, Bahamas, or call (809) 374-1244.

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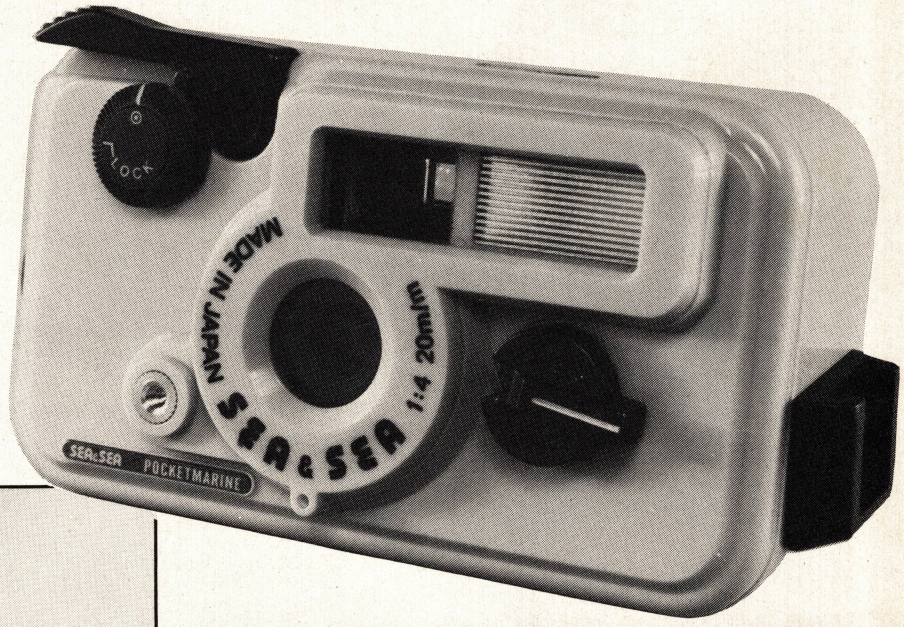

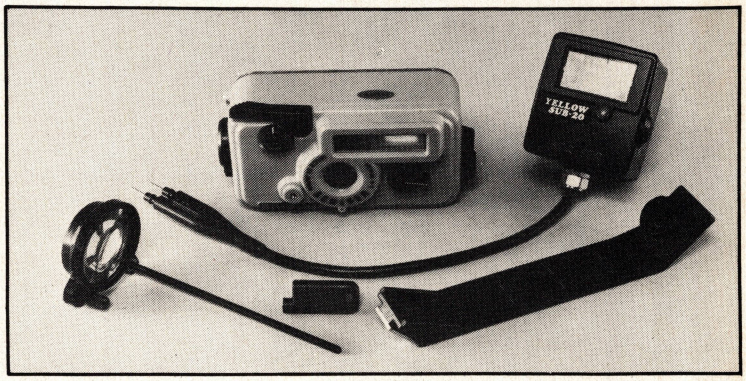

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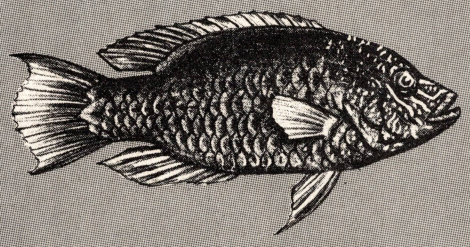
Tripletail Wrasse

(Cheilinus trilobatus)

The wrasse family, Labridae, is one of the largest groups of fishes. The number of species in the family is estimated to be between 500-600 in all. Their physical characteristics are extremely varied. Where one wrasse might be inches long and look like a cigar, another will measure ten feet in length and weigh in at several hundred pounds. ☐ The Indo-Pacific genus *Cheilinus* comprises the bigger wrasses. The maximum size for the tripletail wrasse, *Cheilinus trilobatus,* is about 26 inches. It is similar to the closely related *Cheilinus undulatus* (known as the Napoleon fish in the Red Sea; hump-headed maori wrasse in Australia), but *C. undulatus* grows to about twice the size (48 inches) and develops the characteristic bump on the forehead late in age. ☐ The tripletail wrasse is found from the Indo-Pacific to the Red Sea (where it is called clown wrasse), and it is found along the Great Barrier Reef of Australia (where it is called the tripletail maori wrasse). Specifically, it has been recorded from Taiwan, Mombasa and at the southern end of the Gulf of Eilat. ☐ Like all wrasses, *Cheilinus* individuals have the tough canine teeth at the front of their upper and lower jaws, large snouts, and thick lips. The body is fairly deep and compressed, and there are large scales covering the head (except for the snout), most of the body, and the bases of the dorsal and anal fins. The different species within the genus are identified by their individual color patterns, but all *Cheilinus* species have the spot and line configuration such as that found in *C. trilobatus.* ☐ The tripletail wrasse is so-called because the tail fin of the adult takes on the appearance of having three portions. As the fish grows, the outer and middle rays of the tail become elongated and the tail appears tri-lobed (thus the scientific name *trilobatus).* The overall color of the fish is an olive green, and there are conspicuous scarlet markings on each scale, plus scarlet red specks near the front of the body. Red lines radiate from the eye. There is often a smattering of bright blue spots mixed in with the red spots toward the tail, but these spots are missing in some individuals. Wrasses are notorious for the color changes they go through as they mature. Also, males are different from females. Because of the different color phases, ichthyologists at one time counted far more species of wrasses than actually exist and more recent investigation narrowed down the list of names. ☐ Labrids not only change coloration as they mature, but they also change sex. All terminal phase wrasses are male, and these individuals are solitary and usually the most brightly colored. The immature males and females are smaller, drabber and congregate in schools. It has been recorded that terminal phase males mate with one female, while the immature males and females spawn together, in groups. ☐ As might be supposed from the appearance of the strong canine teeth of the *Cheilinus* wrasses, these fishes have a healthy appetite for tough-shelled invertebrates such as crabs, mollusks and sea urchins. Shells and spines do not seem to deter the eating ritual and very often the fish will take the whole animal and swim away while chewing on it. The tripletail wrasse is diurnal, feeding by day and entering a state of sleep at night. Many wrasse species are known to bury themselves in the sand when the sun goes down, and at least one type of wrasse is known to build a protective mucus covering around itself for the night hours. *Cheilinus* may not go through such elaborate sleeping preparations. By day the tripletail wrasse is a conspicuous member of the reef community — the older, solitary ones swimming out in the open, the younger ones staying within or near the shelter of the reef.



Juvenile

Photo By Carl Roessler - Text By Hillary Hauser

Roessler took the photograph in the Red Sea. He used a Nikon F in a Niko-Mar housing, two Bauer E252 strobes in Farallon/Oceanic housings. Kodachrome 25 shot at f16, 1/60 second, 24 inches from the subject.

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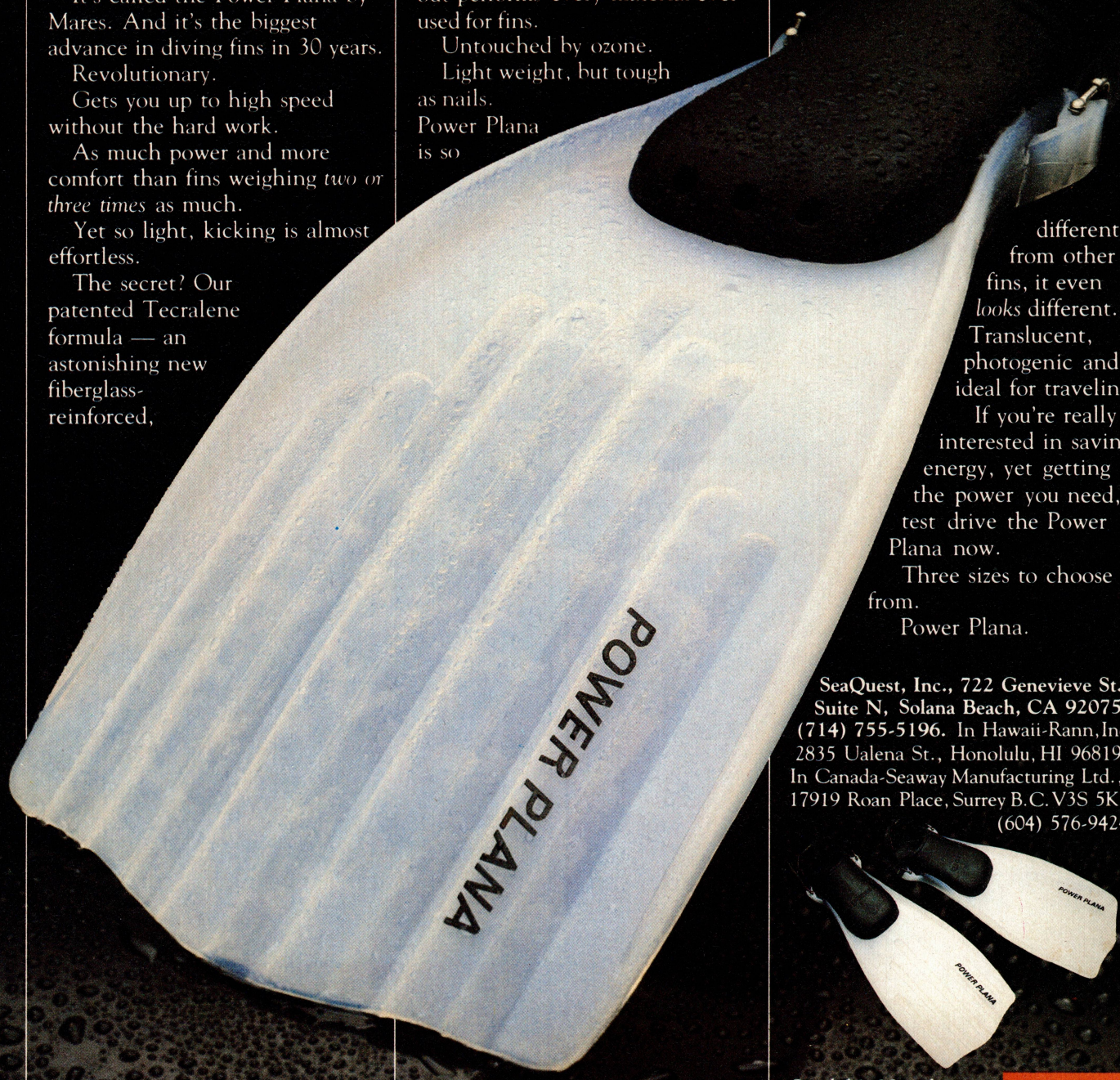

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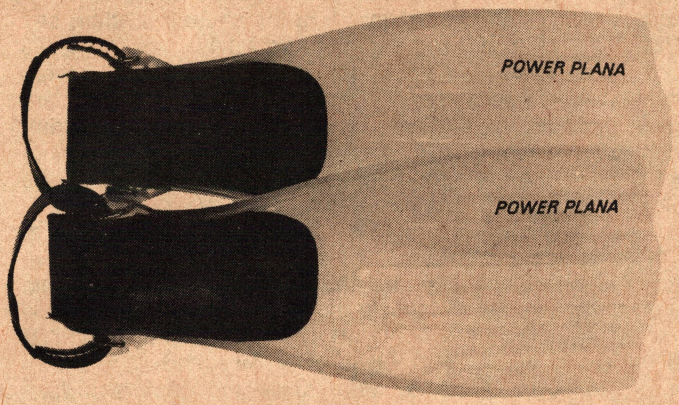


The Mares Power Plana

More Power With Less Effort

Text and Photography
by Eric Hanauer

More than two decades ago, the fiberglass pole revolutionized the sport of pole vaulting. The 15 foot barrier, once considered the ultimate achievement, soon became a commonplace effort. Today, even high school athletes top 16 feet, while world class vaulters soar to heights of 18 feet and more.

The same kind of change is now occurring in fins for skin and scuba divers. The last major development in fin design had come in the late 1960's with the introduction of the vented fin with adjustable heel straps. Most fins introduced since that time were variations on this theme.

The Power Plana, however, is different from any other fin on the market. First of all, it looks different. Its blade is made of translucent Tecralene, a registered AMF/Mares material reinforced with fiberglass. In photographs it picks up the light and color of the environment, making it a favorite with underwater models.

But, looks aren't the only difference. This new material has the ability to store the energy of the diver's kick, then release it at the end of the movement, much like the fiberglass vaulting pole. The result is what every diver looks for: more power with less effort.

The fin actually improves with age. As it ages, the fiberglass becomes stiffer, resulting in more snap. This process will take three to six months, depending on exposure to the sun and the elements. Overall resistance to weathering is described as excellent. Furthermore, Tecralene is extremely resistant to tearing since it has no grain. If a rip begins, it will not propagate as in a rubber fin. The weight of the Power Plana is another advantage. It is 30 to 50 percent lighter than a conventional fin and has neutral buoyancy in sea water. The result is less work for the diver, both on the surface and underwater.

The revolutionary aspects of the Power Plana don't end with the blade. The foot pocket is made of a special formula Tecralene, without the fiberglass. Tecralene, a registered compound, is extremely resistant to sunlight and ozone with or without fiberglass. A mechanical and fusion bond molecularly interlocks the blade to the foot pocket. The manufacturer is so confident of this patented process that a lifetime guarantee is offered against separation of the materials. Close inspection of the Plana reveals how the firm, translucent blade blends into the soft foot pocket. Underneath, the stiff material continues all the way to the heel, which transfers kicking effort to the heel and ankle rather than to the toes.

SeaQuest engineer, Bill Oliver, explained that fin technology had previously been limited by the materials available. Rubber doesn't deliver the snap and thrust of plastic, but anything with snap and resiliency is usually uncomfortable on the diver's feet. The answer was to bond a synthetic elastomer blade to a soft foot pocket. Mares had done that with the original Plana fin, a smaller model with a full foot pocket. Oliver explained that about 80 percent of diving activity in Italy is skin diving, so most of the fins which have come out of that country were small and light. A stiffer, heavier fin was needed to move divers because of the additional drag of a tank, weights, wetsuit and BC. "They [the Italians] were designing sport cars while we needed trucks," Oliver concluded.

When SeaQuest became the exclusive American distributor for Mares, its engineers collaborated with their Italian counterparts to adapt the original Plana fin to the needs of divers in the USA. The Power Plana's blade is longer, wider and stiffer than that of the original Plana. The foot pocket was enlarged to accommodate booties and an adjustable heel strap replaced the full foot pocket. At the present time it is available in medium and large sizes. By January, a small and an extra large model will be added to the line.

The fin sounded too good to be true, but a series of test dives lent credibility to the distributor's claims. The generous foot pockets on the largest fins easily accommodated my size eleven, triple-E feet clad in quarter-inch booties. While kicking to the dive site on my back I noticed the stretch through the ankle joint as I followed through at the end of the kick. I was moving well with less than the usual effort. With a shorter movement, the extra snap provided by the fin agitated the water into the slight boiling action characteristic of an efficient surface kick. When I turned on the power, the fins responded with a considerable increase in speed. The pattern of more power with less effort was repeated underwater. Flutter kicking, dolphin kicking, even sculling were decidedly more efficient than with conventional fins. Though long enough to supply power, the fins were short enough to maneuver in tight spaces. Power Planas are comfortable and can be used to advantage by any size diver, big or small. The separate designations, "comfort fin" and "power fin" are not applicable here because both traits are present in the same fin.

The synthetic elastomer blade has two disadvantages. It scuffs more readily than rubber. The scuff marks will not affect the fin's performance, only its looks. Also, temperatures over 200°F can melt the Tecralene. Keep the fin off surfaces that are too hot to touch with your hand. Caution is advised when storing the fins in a car trunk on a hot day — the temperature can exceed the 200°F mark.

When asked to sum up the Power Plana, Charles Jehle, president of SeaQuest, said, "The technological advancement in synthetic materials will open up new design concepts which couldn't be done with the rubber/neoprene fin. Tooling and materials are expensive today, but as more are produced, prices may actually come down . . . New fins will be designed for specialized applications, but the Power Plana will turn out to be an optimum design. It will be the new standard of the industry."

The Power Plana sells for $60 and is available from your nearest SeaQuest/Mares dealer.

THE COSINA MARINA HOUSING

A New U/W Camera System for the beginning photographer

Text and Photography by Geri Murphy

For the last three years, the Cosina Camera Company of Japan has been secretly working on the development of an underwater camera system which would be almost fully automated and simple to use. Last month, the Cosina Marina Housing was introduced to the American market — much to the surprise of both divers and photographers.

To most American camera buffs, Cosina is a relatively new name. While this company has been manufacturing cameras and lenses for years, many of their products were sold on the U.S. market under other, better known photographic equipment labels. In Japan and other countries of the world, Cosina is a well established name: This company manufactures and distributes no less than 12 different 35 mm cameras and 14 different lenses.

The Cosina Marina System is not just another underwater housing. It is an entire underwater camera system which incorporates an automatic 35 mm camera with motor drive; a radically designed underwater housing; an optical viewfinder; an underwater strobe; a ball-joint flash arm, and a baseplate with handgrip and flash mount. The entire system is compact and will fit into a Pelican airtight carrying case for easy travel. In fact, you can buy the Cosina Marina System as a complete ready-to-go system packed into the Pelican Case.

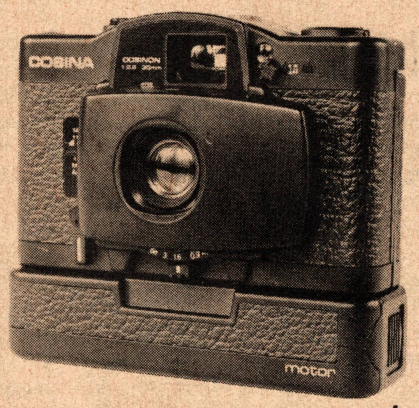
THE CAMERA

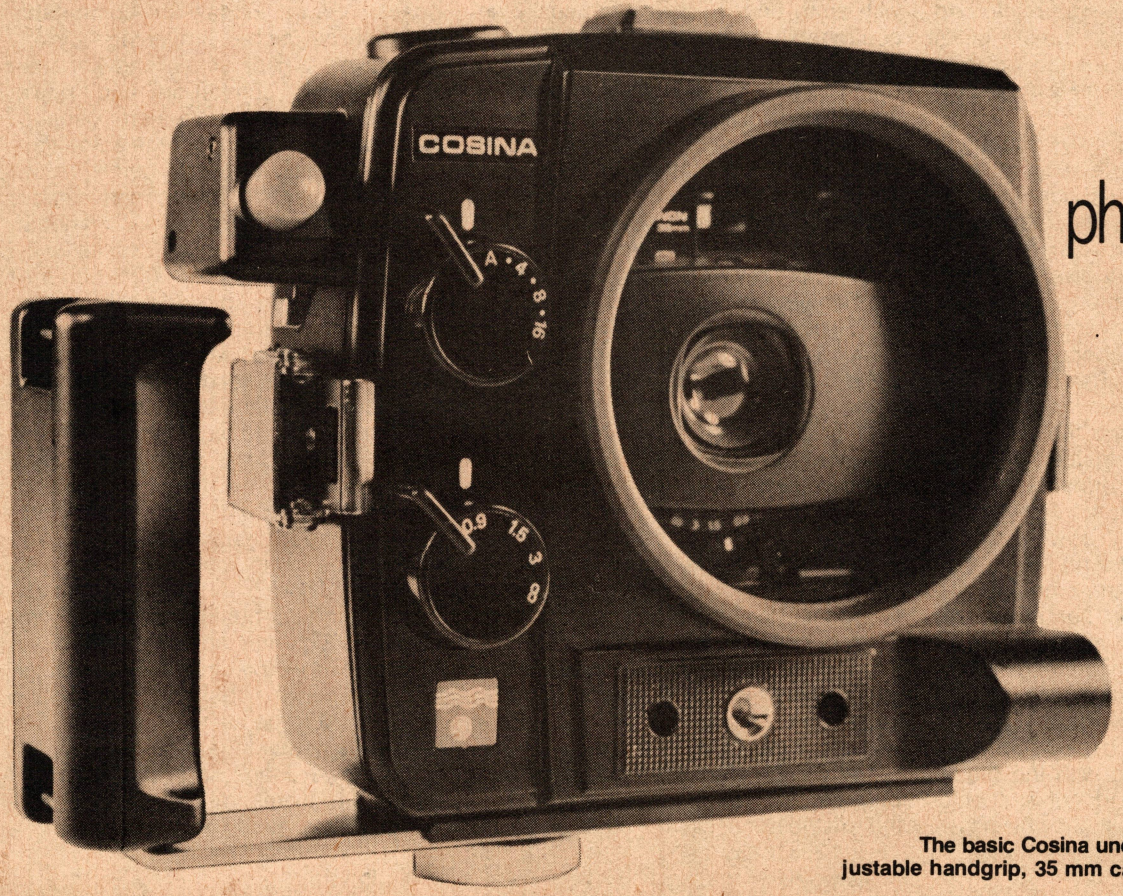
The heart of the Marina System is an ultra-compact 35 mm, automatic exposure camera known as the CX-2. This tiny little camera will fit in the palm of your hand. It is so small that it is at first difficult to believe that it actually uses 35 mm film. The camera has a fixed mount, 35 mm wide-angle lens of excellent quality. An ingenius rotating cover closes over the lens with a simple 90 degree twist of the hand.

The CX-2 is one of those space-age generation cameras which is incredibly simple to use but positively baffling in design. This particular model features a revolutionary exposure system incorporating a fully automatic electronic shutter/aperture mechanism. By accurately sensing the incoming light, this little camera can adjust the shutter/aperture setting anywhere from 1/500 second at f16 (very bright) to two seconds at f2.8 (very dim). In between these two extremes are more than 1000 different exposure combinations from which the camera's electronic system can choose precisely the right setting for perfect exposure.

The CX-2 also features a full range of manual aperture settings, from f2.8 to f16, for use with a strobe (electronic flash). In the manual mode, the flash is synchronized with the camera's shutter at a speed of 1/45 second.

Mounted inside the camera's view-





The basic Cosina underwater system with adjustable handgrip, 35 mm camera and auto winder.

finder are two small indicator lights which transmit information about the camera's electrical function and exposure readings. There is a green light which signals the camera's batteries are producing power. A red light will go on when the light level drops below an exposure value of 1/30 second at f2.8. Incidentally, the automatic light sensor system in the CX-2 camera can be set for a variety of different films ranging from ASA 25 to ASA 400.

Still another unique feature of the Cosina CX-2 is the compact electronic motor drive which can be fitted to the base of the camera. Known as the Cosina CX-W Auto Winder, this amazing little device is powered by two AA alkaline batteries and will operate for at least 30 rolls of film before requiring a change of batteries. The Auto Winder permits the camera operator to keep his/her eye on the subject during the shooting sequence — the film is automatically advanced to the next frame each time the camera is fired. The Auto Winder also allows rapid firing up to a speed of one frame every second. If needed, you could shoot an entire 36 exposure roll of film in less than a minute!

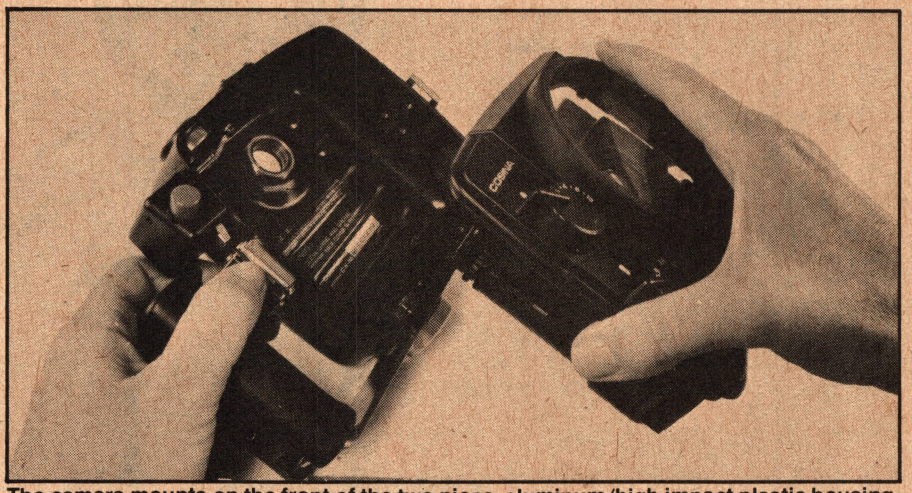
The unique combination of a fully automated exposure system and power drive makes the Cosina CX-2 one of the easiest-to-use 35 mm pocket cameras. When not installed in the underwater housing, the Cosina CX-2 becomes the perfect photo companion for topside photography on the dive boat, the beach or around home. The camera and auto winder retail for approximately $271. In addition, a mini land strobe (CX-LS) can be purchased for $58. This tiny little unit fits onto the shoe mount at the top of the camera. It is powered by a single AA alkaline battery and produces an audible signal when the ready light goes on.

THE HOUSING

The Cosina Marina Housing (CX-M) is perhaps one of the most startling innovations in underwater housing design that we have seen in a long time. For the last 25 years, manufacturers have been building underwater housings out of plastic (Plexiglas, Lexan, PVC) or out of metal (cast aluminum, stainless steel, brass) but this is the first time that a manufacturer has produced an underwater housing which is a combination of plastic and metal.

At first glance, one is immediately attracted to the unusual design and expert workmanship of this housing. It is incredibly compact, extremely lightweight and amazingly well engineered for a low priced housing. You can't help but describe it as being delightfully cute.

The housing is basically a two-part unit which fits together by means of a bore-type O-ring seal and two stainless steel cam-lever snaps. The rear half is a one piece seamless aluminum stamping almost two inches deep. The rear wall of the aluminum case is ribbed for added strength and the manufacturer guarantees watertight performance to at least 165 feet. This portion of the housing contains two viewports — one on the back of the housing for the camera viewfinder and the other on the top of the housing for reading the camera frame counter. Solidly mounted on the sides of the housing are two stainless steel snaps or clamps, fitted with special locking tabs that prevent accidental release while underwater. On the right hand side of the aluminum case there is a red button which activates the shutter lever. The lever itself is actually mounted on a rotating stainless steel shaft sealed with an O-ring.



The camera mounts on the front of the two piece, aluminum/high impact plastic housing.

Other accessories on this part of the housing include an external shoe mount on the top for an underwater optical viewfinder. There is also a threaded tripod mount on the bottom of the housing which permits the attachment of a handgrip or the quick mounting of a flash bracket.

The front portion of the housing is made from an injection molded high-impact plastic which is extremely strong and durable. The O-ring groove is precision molded right into this section, providing a positive and safe main seal for the housing. A large, two and seven-eighths inch diameter viewport is fitted into the front and contains a flat lens port made of optical glass. The port is large enough to accommodate the camera's wide-angle lens, as well as allowing the diver to check the alignment of his external control levers for both focus and aperture settings.

The front of the housing also features a molded baseplate onto which the camera fits snugly. The camera and its auto winder are mounted on the front of the housing and need not be removed for film reloading. One of the best features of this system is the way in which the camera is solidly locked into the housing. The camera is held in place at both the top and the bottom to prevent any possible wiggle or misalignment. A threaded tripod screw holds the base of the camera/auto winder to the housing baseplate. Another locking screw at the top of the housing holds the shoe mount rigidly in position and provides solid contact for the underwater flash sync shoe.

The front of the housing is also fitted with a standard type Nikonos III-IV underwater flash connector. The housing can be used with either the Cosina CX-ST Seamaster or any other underwater strobe that has a Nikonos III-IV flash connector.

Also mounted on the front of the housing are two underwater controls for camera focus and exposure settings. Both controls operate on an ingenious rack and pinion gear system which allows them to swing smoothly and easily. The upper control features an exposure scale for the automatic exposure setting (A) or manual flash exposure settings from f2.8 to f16.

The lower control operates the camera's zone focusing system. The scale indicates four distinct zone settings: 0.9 meters (3 feet); 1.5 meters (5 feet); 3 meters (10 feet); and infinity.

A convenient grip handle comes with the housing. It is designed to slide up close to the side of the housing, thus activating a safety lock which will prevent the accidental firing of the camera when it is not in use. The housing retails for approximately $270.

THE VIEWFINDER

In order to make the Marina Housing a complete and easy-to-use system, Cosina has developed a number of accessories. The first, and perhaps most critical, is the underwater optical viewfinder which fits on top of the housing. The housing has a rear viewport, but it is not practical to attempt accurate framing

through the camera itself. There is simply too much distance between the diver's eye (when wearing a facemask) and this small diameter viewfinder. The purpose of the rear viewport on the housing is primarily for viewing the red and green indicator lights illuminated in the camera viewfinder.

Divers will find the Cosina CX-OF Underwater Optical Viewfinder to be a tremendous help for easy and accurate picture framing. The viewfinder has a metal barrel and high quality optics. It slides into a shoe mount on top of the housing and is locked in place with a threaded screw. The viewfinder also features a camera parallax adjustment wheel which allows the viewfinder to be set at the precise angle that matches the camera focus distance. The adjustment wheel is calibrated both in meters and feet. The Cosina Viewfinder retails for approximately $79.

THE UNDERWATER STROBE

The Cosina CX-ST Seamaster Strobe was designed specifically for use with the Marina Housing. The 70 degree angle of coverage is more than required for the camera's 35 mm lens, thus allowing for a small margin of error in aiming. Powered by four, AA alkaline batteries, the Seamaster will produce approximately 160 flashes. Recycle time ranges from 7 to 12 seconds, depending on the power level of the batteries. There is a threaded cap on the rear of the strobe head that allows access to the battery compartment. The strobe has an underwater guide number of 16 for ASA 64 film and retails for approximately $297.

Also available from Cosina are two flash arms — an 18 inch model and a 24 inch model. Both are ball-joint designs which allow quick and convenient adjustment of the strobe in more than 100 different angles and positions. The flash arms attach to the housing via a stainless steel flash tray mounted on the base of the housing. A large shoe mount and threaded locking screw allow quick detachment of the arm. The ball-joint flash arms range in cost from $117 to $135 and the flash tray sells for $54.

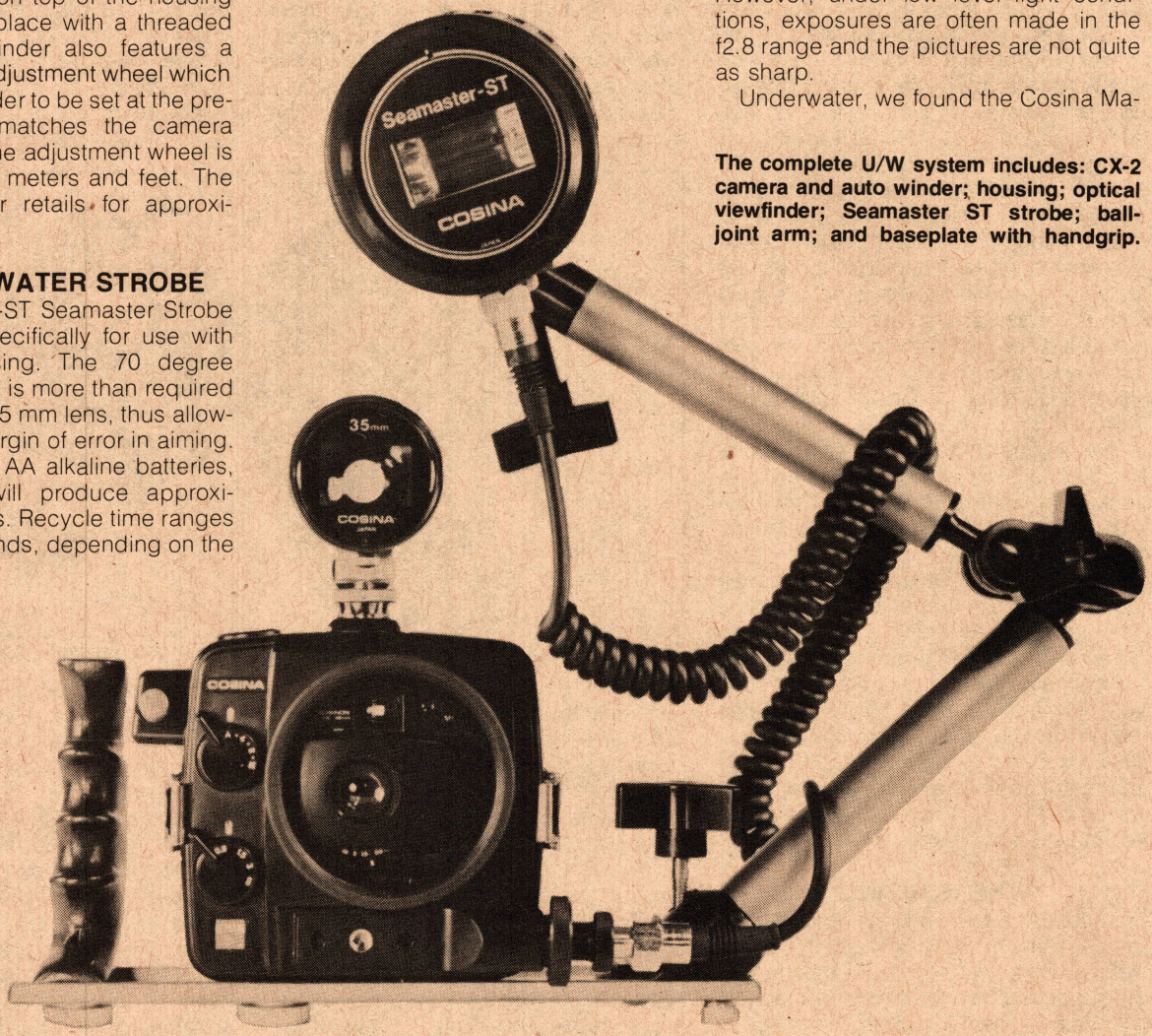
PERFORMANCE

The editors of SKIN DIVER Magazine tested the Cosina Marina Housing under a variety of dive conditions, including the swimming pool, California kelp beds and the warm waters of the Bahamas. All types of film were used, including Ektachrome 64, Fujichrome 100, Ektachrome 200 and Tri-X black and white. In addition, the CX-2 camera was tested above water with shooting sessions on dive boats, on the beach and indoors. Here is what we found.

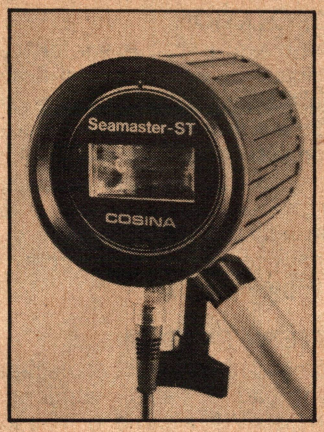
The Cosina Housing and Underwater Strobe performed perfectly during some 20 different test dives. There were no leaks whatsoever — a tribute to the watertight integrity of the Cosina design. In addition, the underwater strobe fired each and every time, attesting to the system's electrical integrity.

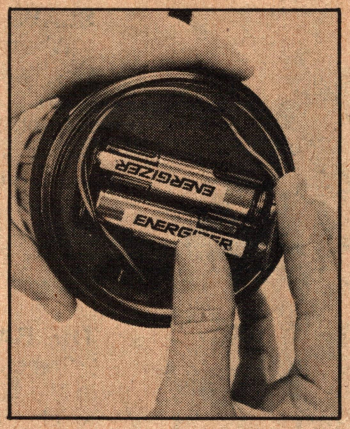
In addition, the CX-2 Camera turned out to be a fantastic little pocket camera for above water use. It is extremely easy to load, to store and to operate. It can be carried in the pocket of almost any jacket or windbreaker and quickly produced for those rare photographic opportunities. It is a delightful camera unit for candid portraits aboard the dive boat or quickie "grab" shots when an unexpected event begins to unfold. The sharpness of the picture images ranged from fair to excellent, depending upon the ambient light level. Under bright, sunny conditions and with the CX-LS land strobe (about $58) this little camera will produce wire sharp pictures because the shutter/aperture mechanism is operating in the f16 range. However, under low level light conditions, exposures are often made in the f2.8 range and the pictures are not quite as sharp.

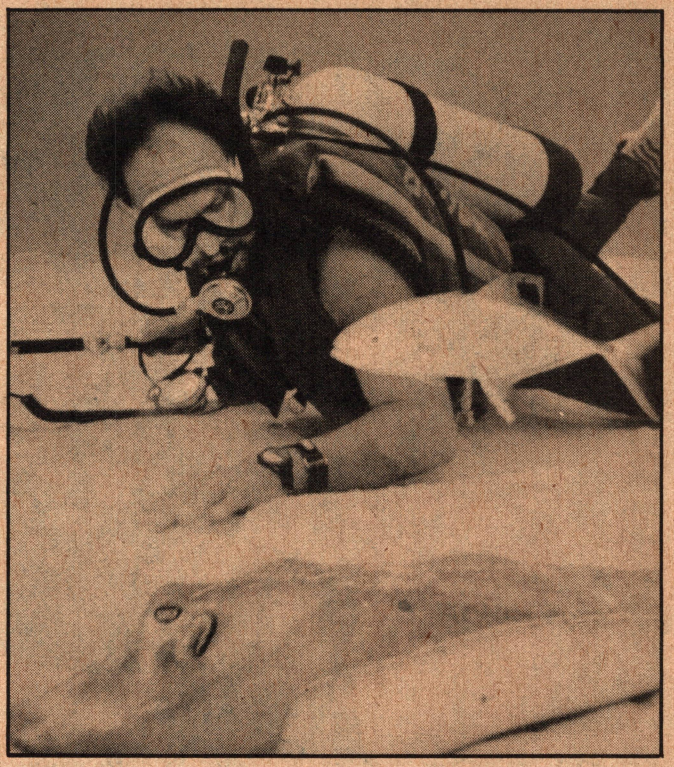
Underwater, we found the Cosina Marina System could produce photos just as good as the Nikonos IV camera and 35 mm lens. It worked best at distances of three to five feet using the minimum settings of 0.9 meters or 1.5 meters. Since the camera's 35 mm lens is being shot through a flat lens port, it is affected by the index of refraction. Light rays passing through the flat port and into the air inside the housing change angle and produce a slight telephoto effect. In essence, the 35 mm lens in water behaves like a 47 mm lens in air. This extended focal length forces the photographer to back away from his subject slightly further in order to frame the entire subject. We found the Cosina Marina System to be

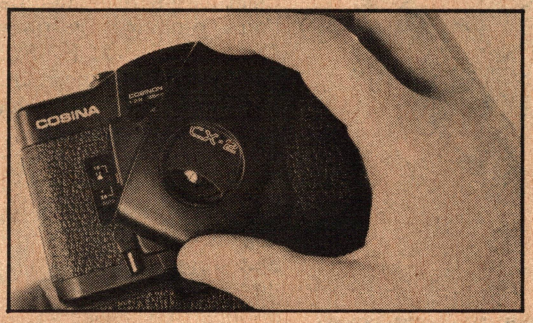


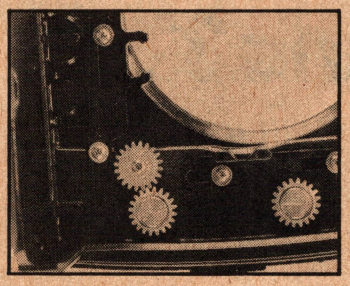
The complete U/W system includes: CX-2 camera and auto winder; housing; optical viewfinder; Seamaster ST strobe; ball-joint arm; and baseplate with handgrip.











Above, Cosina U/W system recorded Rodney Canham's attempts to befriend a large stingray. Top left, the Seamaster ST U/W strobe produces 160 flashes with a seven second recycle period. Top right, the strobe is powered by four AA disposable batteries. Center, the CX-2 camera has a unique lens cover which opens when rotated 90 degrees: The auto winder will not work and film will not advance when it is closed. Lower left, the camera is held in place with a baseplate screw, and this shoe mount anchor. Lower right, rack and pinion gears control focus, aperture.

ideally suited for photographs of fish, seafans, small to medium sized coral formations, colorful sponges and head-and-shoulder shots of divers underwater. Shooting broad reef panoramas or long shots of divers proved to be somewhat difficult because of the distance between the camera and subject. Underwater visibility at these long shot distances reduced image sharpness considerably.

The Cosina Marina System is particularly useful for beginning underwater photographers who have little or no experience in the operation of a complex camera system. By setting the exposure level on A, the novice operator need not worry about computing exposure values. The camera simply reads the incoming light and automatically adjusts the shutter/aperture for the right setting. We found that Fujichrome 100 film worked better than the slower Kodachrome 25 or Ektachrome 64 films. The faster speed of the ASA 100 film allowed the camera to select a more desirable f stop for sharper pictures and greater depth-of-field. Yet, the Fujichrome 100 film exhibited fairly tight grain images and good color saturation. Performance was even better when using ASA 400 Tri-X black and white film.

We then tried operating the Cosina Marina System on manual exposure settings in conjunction with the underwater strobe. We obtained our best pictures at the minimum focus distance of 0.9 meters (3 feet) with aperture settings of f11 and f16. Using the Fujichrome 100 film we found f11 to be a fairly good average exposure setting for such subjects as seafans, sponges and coral formations. However, when photographing highly reflective fish with silvery scales, we found the f16 setting to be more desirable.

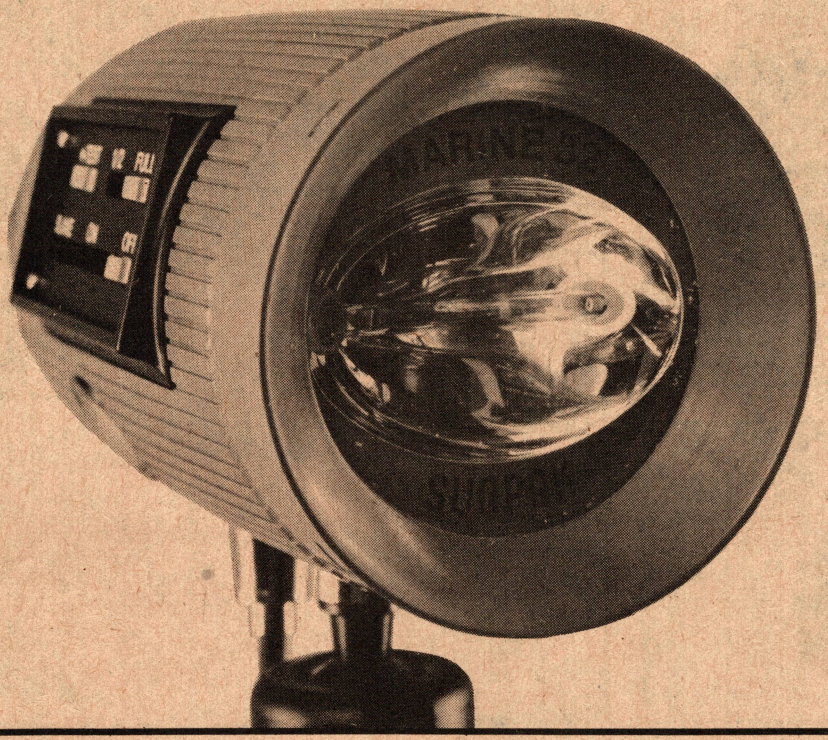
The one limitation to the Cosina Underwater Camera System is the fact that you cannot focus any closer than three feet from your subject. This precludes the possibility of shooting close-ups or macro. However, Cosina has sent word from Japan that it is presently designing a close-up adapter lens system for the Marina Housing. In fact, the front of the housing is already drilled and threaded to accept this future close-up attachment. It should become available within the next six months.

CONCLUSION

We found the Cosina Marina Housing to be cleverly designed, cosmetically attractive and very well built. Best of all, it seems to operate well.

Where does the Cosina System fit in the overall scheme of underwater camera equipment? We feel that it represents a new rung in the stepladder of underwater products, positioned somewhere between 110 U/W systems and the Nikonos IV-A 35 mm. While it lacks the professional dimension of an interchangeable lens system such as the Nikonos IV-A, this unit delivers good quality 35 mm pictures in either slide or print form. What is more, it features a motor drive capability which is not available for the Nikonos IV-A and is only found in the extremely expensive SLR housings. In our opinion, the Cosina Marina Underwater Camera System is a fine choice for the beginning underwater photographer who wants to shoot color slides or make enlarged prints. The system is amazingly compact and easy to use. Furthermore, the camera will prove invaluable for use on land.

Pelican Products is the exclusive distributor of the Cosina Marina Underwater Camera System. For more information contact your local dive shop or write: Pelican Products Inc., 23763 Madison Street, Torrance, CA 90505.



The Sunpak Marine 32 U/W Flash

By Jim and Cathy Church

Although the basic configuration is reminiscent of the older Marine 28, the Sunpak Marine 32 isn't just an update of the older model — it is a new design.

The flash head is covered with a protective red rubber casing that protrudes a half inch beyond the reflector port. This should help protect the electronics from the jarring effects of impacts. The head is attached to the handle unit with a swivel-tilt (ball and socket) pan head and the handle attaches to the camera bracket with a quick-release clamp. The dimensions (including handle and bracket) are 4 x 7.2 x 15 inches. The entire unit weighs 59.4 ounces in air (without batteries).

The standard camera bracket furnished with the strobe can be used with the Nikonos I, II, III or IV-A, and has a tapped hole for meter or accessory attachment. A different bracket is available for use with the Ikelite SLR Case. The sync plug fits the flash socket of the Nikonos III or IV-A. Accessory adapters are available for use with the Nikonos I or II, and the Ikelite ICS.

With the Nikonos IV-A, Sunpak recommends setting the shutter speed dial to A (automatic). When the strobe is turned on, the shutter speed is automatically locked at 1/90 second; and when the Marine 32 is ready to flash, a red lightning bolt glows in the Nikonos viewfinder. When the Marine 32 is turned off, the automatic aperture-preferred control of the IV-A is activated for sunlight exposures.

THE CONTROL PANEL

Three sliding, magnetic switches are located on the control panel at the right side of the flash head. The power switch has positions for off, on and slave; the power ratio switch has positions for half and full power; and the test switch can be used to trigger a test flash.

Should these switches become jammed with dirt or sand, the owner's manual gives complete instructions for disassembling the control panel (four screws), cleaning the parts and reassembling.

SLAVE OPERATION

When the power switch is set for the slave position, the Marine 32 will flash when its built-in sensor detects the burst of light from another strobe. This slave sensor is located behind a port at the left side of the flash head. For best results, the master strobe should be aimed so its light will strike the sensor of the slave directly. Otherwise, the slave probably won't be triggered.

THE BATTERY SYSTEM

The battery compartment is at the rear of the flash head. A battery cartridge, which holds six AA alkaline or ni-cad cells, fits inside the compartment. An optional, rechargeable ni-cad cluster (the CL-2 cluster and QBC-5 charger) can be used in place of the cartridge.

A fresh set of alkalines will provide up to 75 flashes at full power. The recycle time will be about seven seconds at first and lengthens as the cells wear out. At half power, the alkalines give up to 150 flashes with a beginning recycle time of about four seconds. With ni-cad cells or the rechargeable cluster, you get up to about 50 flashes with a five second recycle at full power. And at half power, ni-cads give up to 100 flashes with a three second recycle. With ni-cads, the recycle time doesn't increase significantly until the last few flashes.

The green ready light is located just beneath the control panel. A blinking light indicates that the capacitor has received a full electrical charge from the battery. A glowing light indicates that the capacitor isn't fully charged, but that the Marine 32 can still be flashed — the power output, however, will be one stop weaker.

FLOOD ALARM AND REPAIR

The Sunpak Marine 32 designers worked hard to minimize both the possibility and the severity of flood damage. The battery compartment lid is the only part of the Marine 32 that you can open. And because the lid is so large, you are unlikely to forget to replace it after charging the battery. The ready light, slave sensor and reflector ports are O-ring sealed, and the magnetic switches do not penetrate the housing.

Should water leak past the two O-rings of the battery compartment lid, a red flood alarm light turns on in the ready light port. If this happens, turn the flash off immediately and leave the water. Remove the battery cartridge, rinse the compartment with fresh water and dry it. Because the battery compartment is sealed off from the electronics compartment, the Marine 32 probably won't be damaged. You must, of course, correct the cause of the flood — which will probably be dirty or damaged O-rings. Lastly, clean the battery contacts within the battery cartridge and compartment.

WIDE-ANGLE DIFFUSERS

Two diffusion filters — #24 and #16 — are available to widen the beam angle of the Marine 32. Without a diffusion filter in place, the U/W beam angle matches the approximate picture angle of the Nikonos 35 mm lens. With the #24 filter in place, the beam covers the approximate area of the 28 mm lens. And with the #16 filter, the approximate area of a 20 mm lens. In air, without a filter, the Marine 32 covers the 28 mm lens. The #24 filter covers the 24 mm lens, and the #16 filter covers a 16 mm lens. A #24 filter is included with the Sunpak Marine 32 at purchase, and the #16 filter is available as an optional accessory.

We believe that the wide-angle diffusion filters increase the versatility of the Marine 32 significantly. The filters fit over the front of the flash head, and have four tabs which press into four slots in the rubber casing to lock them in place. You can easily attach or detach the filters while underwater, and they have a small hole for attaching a safety cord.

U/W GUIDE NUMBERS

The guide number depends on the film speed, power setting and on whether a diffusion filter is used. The ASA 64 U/W guide numbers (feet) are 42 for full power and 30 for half power. Because the half power guide number is fairly high, you could use half power for many of your U/W exposures. This would extend battery life and shorten recycle time significantly. With the #24 filter in place, the U/W ASA 64 guide numbers for full and half power are reduced to 29 and 21. And with the #16 filter, they are reduced to 21 and 14. Our exposure tests, taken in clear water with ASA 64 film and a #24 filter in place produced substantially the same guide numbers.

An exposure table for ASA 50-64, 200 and 400 is attached to the rear of the battery compartment lid. It shows flash-to-subject distances in feet (both air and underwater) for a wide range of consecutive apertures. Because the exposure calculations were first determined for meters, and then apparently transposed to feet for the table, the distances aren't in even increments of one foot. Reading the half-power distances (for apertures from f22 to f4, for example), the distances are 1.2, 1.6, 2.3, 3.3, 5 and 7 feet.

MAINTENANCE

The owner's manual spells out how to wash the exterior of the Marine 32, but doesn't really cover how to care for the two O-rings which seal the battery compartment lid. The first is at the base of the compartment threads at the rear of the flash head. To remove this for cleaning, press both thumbs against the O-ring about an inch apart. Press and slide your thumbs together, and the O-ring will bulge up out of the groove. To remove the O-ring located inside the battery compartment lid, slip the rounded edge of a thin credit card beneath it from the inside and lift it up out of its seat. The credit card can be used with the other O-ring as well. Clean the O-rings with a soft cloth, and apply a thin coating of silicone grease with your fingertips.

Use a thin coating of silicone spray for the general maintenance of exterior metal surfaces, but wipe off any excess. For corrosion, try small amounts of WD-40, but don't apply it directly to rubber or plastic parts.

Upper left, the flash head of the Sunpak Marine 32 strobe is covered with a protective rubber casing. Upper right, two diffusion filters are available to widen the beam angle. Below, clockwise from left; battery cartridge (holds six AA cells), control panel showing operation modes, and flash head swivel (operated by lever).

photos/Geri Murphy

OUR OPINIONS

The protective rubber casing, magnetic switches, flood alarm and wide-angle filter diffusers are definitely plus features that are rarely found with other strobes. Underwater, the Marine 32 has good balance and is comfortable to hold and operate. Lastly, rubber protectors have been placed at both ends of the sync cord and should significantly extend the life of the cord.

There are some disadvantages:

The slave sensor is on the right side of the flash head. If you hold the master strobe in your left hand, and the slave strobe is on the right, the sensor is hidden from the light of the master strobe.

Owing to an optical illusion, the ready light and sensor ports of the Marine 32 we tested appeared to be partially flooded when we took the strobe underwater. This should be mentioned in the owner's manual.

Although the manual is quite complete, the translation from Japanese to English could be improved.

MORE INFORMATION

For more information and prices, write to: Berkey Marketing Companies, Inc., 25-20 Queens Blvd., Woodside, NY 11377.

The Making of a Dive Suit

Text and Photography by George Cozens

Not that I'm a pantywaist (pantywaste? . . . sissy!) but I just can't imagine attempting a dive without some form of thermal protection. Perhaps I start with a psychological disadvantage, knowing that water conducts heat away from the body about 25 times faster than air. Not that I have an especially weak mind, easily influenced by such suggestions, but I can get chilled even in tropical waters of 80°F or more. So, the wetsuit (or dive suit, to be more general) is, to me, an important item. To see one being made, especially by experts, would be fascinating — and even educational, I thought.

The place to visit, I was told, was SeaSuits. That seemed like a logical choice. It is a well-established company (making dive suits for more than 22 years); local (Costa Mesa, CA); and, has developed an excellent reputation in the industry.

Arrangements were made and off I went. Upon arriving at their plant, I muttered something about SKIN DIVER, and was immediately whisked into the office of the proprietor, Jack Bradley. Soon, coffee was served. Gads! What a reception. I was impressed, and at the same time, a little apprehensive — half expecting Jack to intimidate me with an intense sales pitch. Fortunately, my fears were unfounded. The conversation was quiet, calm, even reserved. About the only thing Jack wanted to impress upon me was SeaSuits' sincere commitment to, "design, quality, and fit." That sounded pretty good, I thought, but what really counts is the final product (i.e., "where the rubber meets the road" — ah, make that, "where the rubber meets the skin," with apologies to Firestone).

So, off we went into the plant for my first view of commercial suit construction. SeaSuits makes inflatable suits and wetsuits, as well as apparel for other aquatic sports.

Our first stop was the receiving area to inspect roll upon roll of neoprene material. Not just any old neoprene, mind you, but Rubatex G231N, one of the finest neoprenes available. It is nitrogen blown (for better insulating qualities), and recovers well after repeated compression/decompression cycles. This material comes in 40 inch widths and is 10 to 50 feet in length. Five different thicknesses are available: 1/16, 1/8, 3/16, 1/4 and 3/8. The 1/16 inch thickness is used more in SeaSuits' other water sports garments (e.g., apparel for surfing, water skiing, kayaking, etc.). The 3/8 inch thickness is used more by cold-water divers. The remaining thicknesses cover the needs of more normal dive applications, in tropic as well as temperate waters.

In addition to these different sizes, the neoprene material is available in a variety of surfaces (or surface coverings):

1. Smooth skin — preferred by some divers, because of its additional warmth when worn against the body. (It provides a better watertight seal, but makes the suit more difficult to put on — a problem helped by using talcum powder or liquid soap).

2. Textured skin — normally found on the outside of the suit, this bare neoprene surface has a pattern which increases the material's flexibility and improves its resistance to abrasion.

3. Nylon fabric — bonding nylon to one or both sides of the neoprene (nylon 1 or 2, respectively) increases the neoprene's resistance to tearing and abrasion, but reduces its flexibility. It also lengthens drying time because the nylon fabric retains some water. Nylon on the inside allows the suit to be put on and removed more easily, while nylon on the outside helps protect the neoprene from cuts and abrasion. The latter also increases the wind chill factor between dives because of the water evaporating from the fabric.

4. Lycra fabric — bonded to one or two sides of the neoprene (Lycra 1 or 2), Lycra offers the same advantages as nylon, plus, it is even easier than nylon to get on and off. Also, it provides more flexibility and ease of movement (when worn inside), and retains less water. The suit dries more quickly and the wind chill factor when it is on the outside is less.

5. Combinations — although the four neoprene surfaces can be mixed or matched, the most common combinations are nylon 1 (nylon inside, textured skin outside), nylon 2 (nylon on both sides), and nylon/Lycra (usually nylon inside, and Lycra outside, for better flexibility, quicker drying, etc.). This latter material is called Aqua-Shed by SeaSuits.

Besides all these different thicknesses and surfaces, there are a kaleidoscope of colors: eight for nylon, and 11 for Lycra.

From the receiving area we moved into the cutting area, containing numerous tables. There was a large wall, on which hung dive suit patterns (templates). The simple appearance of these, which look something like pieces of abstract art, belies the years of development that have gone into them. From these templates are cloned similarly shaped pieces of neoprene material, which, when connected together, form dive suits with a number of features: three-dimensional jackets and pants, contoured to fit the diver snugly without unduly restricting freedom of movement; inset panels in the suit, to enhance the style and comfort, while relieving the stress at critical points; and innovative styling, such as the multicolored arm and leg stripes, or the women's French cut jacket. The same style and size of suit may require different sets of patterns which depend on the suit's applications. For example, a suit may be cut from one set of patterns if it is to be used for sport diving but be made from a different set of patterns if it is intended for a special application — say, for military paradivers, where more exaggerated bends at the elbows and knees allow the wearer to sit more comfortably during long military flights.

SeaSuits makes stock dive suits in nine different sizes (from triple extra small, to double extra large), in three different combinations, in six different styles, and for male and female divers — not to mention the many optional features: turned-in neck collars, wrist and ankle cuffs; attached hoods; neck collars on farmer john pants; thigh and knife pockets; and spine, elbow, and knee pads. Now, if we add in the numerous dive accessories, two styles of vests, three series of hoods, four types of boots, and three kinds of gloves: we can begin to imagine the tremendous number of patterns involved, and the work it took to develop them.

As if this weren't enough, additional, temporary patterns are required for each custom suit. These custom patterns, usually of paper or thin cardboard, are made from scratch — generated from the 30 to 35 measurements taken from the customer.

At the construction site, the cutter selects the proper templates from the assortment hanging on the wall and traces their forms onto a single sheet of neo-

prene for a custom suit, or onto the top layer in a stack of up to 25 layers, for stock suits. Now, wielding a funny looking electric knife with a vertical blade, the cutter retraces the outline of the pattern, and, within seconds, from 1 to 25 rubber clones are produced. After all the necessary pieces are cut, they are forwarded to the gluing tables, where young ladies paint the edges of the stacks with two separate coats of neoprene cement. After this second coat, the pieces are separated from the stack, their edges painted with cement a third time, allowed to dry a few minutes, and then mated with their adjacent parts in the suit. If inspection of the seams reveals spots that need touch-up, a fourth coat of cement is applied. A couple of items require a much more extensive gluing operation — namely, the molded sole boots, and the water-tight zipper sections in the Primo inflatable suits. These items require so many gluing/drying cycles, that the entire operation takes about four days.

After gluing is completed, the suit components are moved to the sewing areas, where they will undergo one, or more, different types of sewing operations:

1. The main seams in jackets, pants, boots, etc., go to a blind stitcher which is used on material with a nylon or Lycra surface. The needle of this machine appears to rock back and forth, in a semicircular motion, and in so doing, binds the fabric on each side of the seam line, without penetrating clear through the neoprene — hence a blind hole, so no water can leak through the thread hole. If the material has fabric on both sides of the neoprene a blind stitch is performed along the seam on both sides.

2. Parts of suits requiring zippers go to seamstresses operating zipper machines. The main zippers on wetsuits are made of Delrin by YKK. The pull-tabs are large and rugged. The plastic teeth are self-lubricating. The Primo inflatable suit uses a large, unique, metal-tooth zipper which has been tested by Underwriters Laboratory for water and air tightness.

3. Velcro fasteners are sewn on with a straight, single needle sewing machine.

4. If rolled edges are desired around neck, arm, wrist, or ankle openings, the suits are sent to one of the walking foot sewing machines. The name was derived from a set of upper and lower feet near the needle that grab the material on the top and bottom and push or "walk" it by the needle to prevent it from bunching up or gathering. The final result is a nicely finished roll or fold along the edge of the material, secured with a zig-zag type stitch.

5. An alternative to rolled edges is SeaSuits' Sea-Trim. Here, a strip of Lycra material is wrapped around the raw edge of the material and sewn into place. The result is a finished edge (no raw edge, or fabric to delaminate) without the bulk of a rolled edge. But, this requires a unique sewing machine and one more operation.

6. One last sewing operation, on yet another machine, is the simple open stitch used in making gloves.

In all of these sewing operations, an exclusive, silicone injected, Dacron polyester thread is used. It has the same advantages as nylon thread, but doesn't tend to cut into the neoprene like nylon.

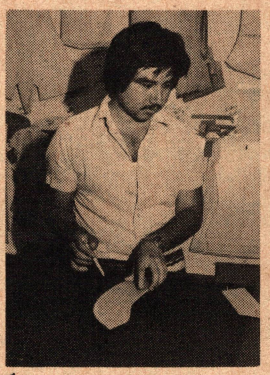
About all that remains are the attachment of snaps and/or twist-locks, if any, which are done on automatic or manual applicators, and the addition of the SeaSuit, heat-sensitive vinyl label, which is bonded to the suit with a hot press much like the ones used by photographers for mounting prints to mount boards.

In some cases, the order of fabrication steps changes slightly. For example, the construction of some sub-assemblies may go from cutting, to gluing, to sewing, and then back to gluing for mating with the rest of the suit, then on to sewing, etc. Overall, the steps themselves are the same. Inspection and quality control are continuous processes during each stage.

That basically is the story of suit construction at SeaSuits. After completion, the suits are given a final check, then receive an assortment of tags before being packed into boxes to await delivery.

After seeing the entire process of suit fabrication, from raw materials to finished product,I must say I was impressed. The making of a dive suit was much more involved than I had expected. Considering the cost of materials, specialized machines and the extensive amount of labor, it is small wonder why they cost as little as they do. I was also impressed with SeaSuits — their patience in showing me their operation, the complexity of their equipment and the skill and care of their employees. They did appear to be committed to their product — its design, quality and fit. But I should have already realized this. I've had my own SeaSuit for about a year now.

(1) Copying a pattern onto a sheet of neoprene. (2) Cutting out the suit panels with the electric knife. (3) Adding the third coat of neoprene cement to the individual wetsuit panel.



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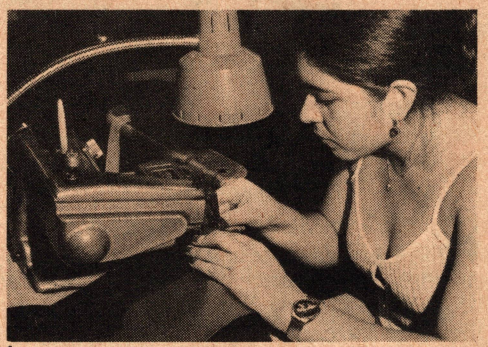

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(4) After gluing is completed, components undergo one or more different types of sewing. (5) The finished suit is a sturdy, well-fitting, quality garment and it comes with a one year warranty.

5

110 WONDER

Sea & Sea's Pocket Marine

By Rick Frehsee

Little Yellow Hits the Depths Automatically to fill an Important Gap in U/W Photography

For those who would like to experience the joy of clear, colorful underwater photos without the fuss, Sea & Sea's new Pocket Marine 110 can do the job. In fact, this little camera has many features found on only the most expensive automatic designs. It produces quality color prints or slides in the 110 format; a very convenient cartridge load, no-focus approach to picture taking. A sharp 20 mm wide-angle lens ensures results topside or underwater with subjects in focus from a few feet to infinity. After each snap of the shutter, a battery driven autowinder smoothly advances the film for the next exposure. Add the YS-20 amphibious strobe and a jiffy close-up attachment and you're ready to shoot an impressive range of snapshots from close-ups to wide-angles.

The sturdy Pocket Marine is truly a diver's camera. Although quite suitable as a topside quick shooter, it will take a considerable plunge in the briny blue without the slightest hint of stress. Recently I tested the Pocket Marine with the help of Peter and Alice Hughes of Dive Bonaire. The results were impressive. Aboard the flattop dive boat I loaded film and batteries in about the same time it takes to put a regulator on a tank. In a pinch, you can stuff the whole outfit into the pocket of your BC with just the strobe head sticking out.

I zipped down the reef slope to a depth of 130 feet for the first few exposures to prove that Little Yellow can indeed do it deeper. Working my way slowly up the reef slope, I took a series of close-ups and wide-angle pictures on the same film cassette. The small package feels good in your hands and the shutter and autowind are crisp and sure. Most people miss the point of having a winder. The auto-advance is a useful feature providing a means to advance the film without taking your eyes off the subject. With the underwater strobe, I kept my eye glued to the subject and slowly counted to six to assure flash recycle time. Note: The controls are small which makes them difficult to operate with a gloved hand, a common complaint with small cameras.

The Pocket Marine has an adjustable aperture from f16 to f4. The owner's manual gives estimated settings for the lens topside and underwater which proved useful and accurate in Bonaire's tropical conditions and clear water. The

wide-angle, close-focusing lens is an important feature of the Marine 110. Instamatic cameras with a fixed focus lens seldom allow you to get close enough to the subject for sharp, colorful photos. With Little Yellow you never have to be more than 40 inches away from your subject. A window large enough to be used with a low volume mask gives you a slightly narrower view than the lens. Or, with practice, you can merely point and look over the camera to estimate your field of view. This point and shoot method will yield acceptable results.

A built-in flash is included on the camera for topside exposures in dim light. Although this could be used in very clear water, any particles suspended in the water would be lit up in front of the lens owing to the position of the flash. You would also have trouble using the strobe in very shallow water, as the bright natural light might overexpose the film with the camera on flash setting. If you do use the internal flash, I determined that 40 inches is the proper distance from camera to subject with ASA 100 film. Advanced marine shooters can discover the real magic of underwater photography by adding the YS-20 marine strobe to their cameras. Electronic flash can restore warm colors and remove harsh shadows. The factory or dealer can install a marine connector which will accept the YS-20. The strobe allows for changes in lens openings to consider subjects at various distances and reflectivities. A built-in slave mode adds professional versatility, and since the strobe can operate independently of the camera, photographers who upgrade to a Nikonos or SLR housing system will have a mini-strobe for backlighting and two-strobe shots.

The nifty close-up system has a stem that screws into the camera front next to the primary lens so that it can be swung in and out of position during the dive. With the close-up lens and scale rod you can capture frame filling shots of corals, sea anemones and featherdusters.

Back at Sea & Sea's headquarters in Fort Lauderdale, Florida, I compared my Kodacolor prints with those taken by company president, Ford Scott. How good were the results? Let's say that they were the best I have seen with the 110 format and nearly as good as I've seen taken with the 35 mm camera. The Pocket Marine 110 fills an important gap in underwater photography. People who can't be bothered with complicated cameras will love Little Yellow's direct approach to picture taking. It's a great first camera which can turn into a dependable second camera for more advanced photographers.

For information and a brochure, write Sea & Sea U.S.A., 1334 S.E. 17th Street, Fort Lauderdale, Florida 33316 or visit your local pro dive store.

POCKET MARINE 110 AT A GLANCE

Film format	110 cartridge, prints or slides
Lens	20 mm f4, ground glass (4 elements)
Aperture range	f4 to f16 in four stops
Shutter speed	1/125 second synced with strobe
Focus distance	Fixed focus, 40 inches to infinity
Maximum depth	150 feet
Film advance	Battery driven autowinder
Built-in-flash	Guide number 26 at ASA 100 (air)
Size/weight	2½ x 5 inches/1 lb.

YS-20 U/W STROBE

Recycle time	6 seconds
Duration	130 flashes on two AA batteries
Slave	Built-in sensor
Guide number	48 at ASA 100 (water)
Field angle	90 degrees
Connector	Sea Loc watertight fitting
Strobe handle	Sea-arm IV available

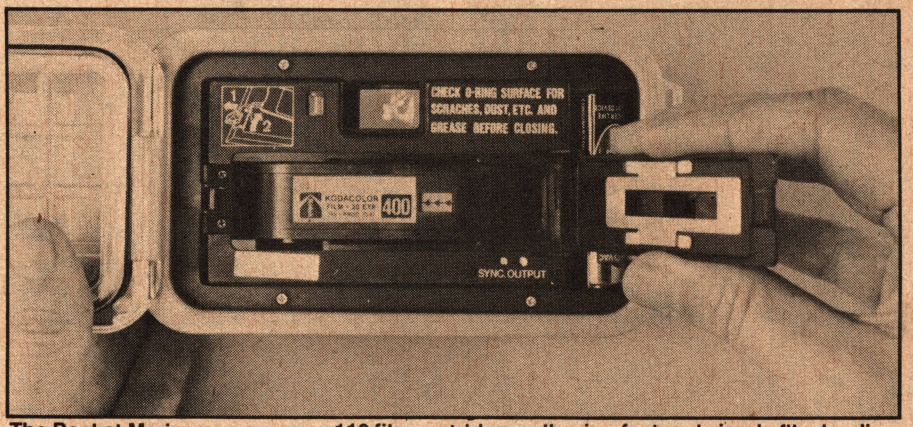
CLOSE-UP KIT

Optics	Single positive lens element
Focus distance	5.4 inches indicated by scale rod
Mount	Screw socket next to camera lens
Format	2 x 3 inches object space

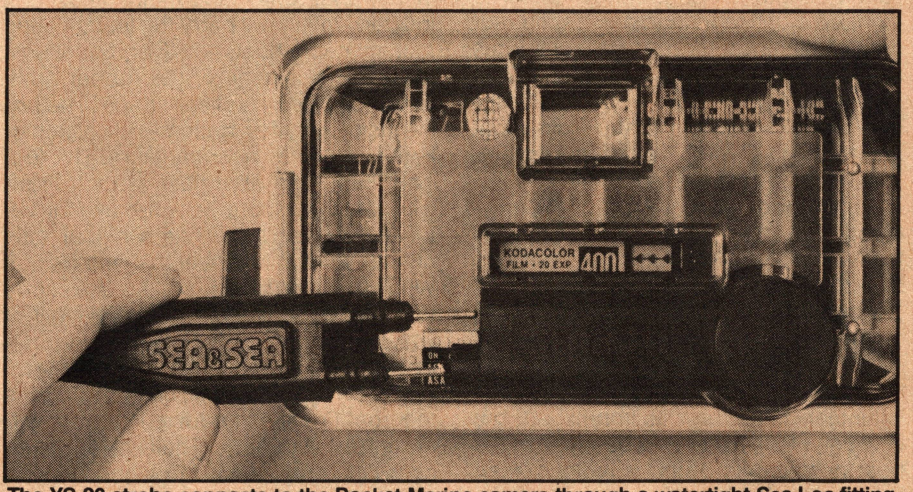
SUGGESTED RETAIL

Pocket Marine	$189.95
YS-20 strobe	$190.00
Sea-arm IV	$ 15.00
Close-up kit	$ 49.00
Sea Loc connector	$ 40.00
Complete system (less close-up)	$425.00

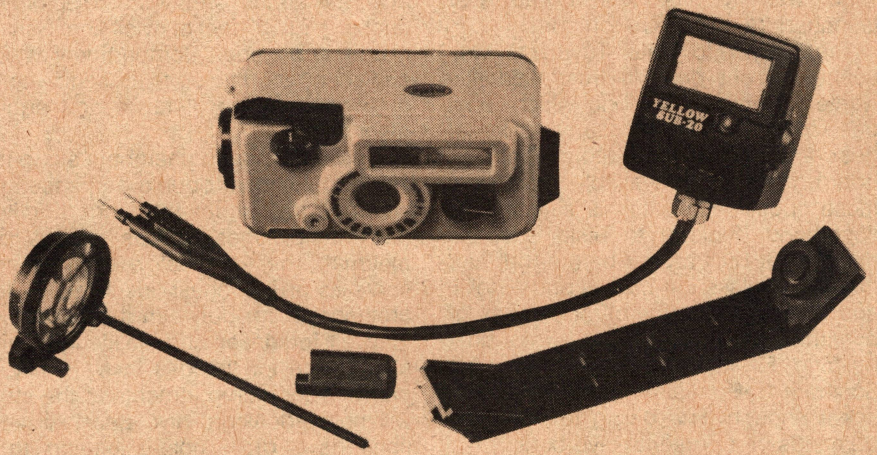
photos/Geri Murphy



The Pocket Marine camera uses 110 film cartridges, allowing fast and simple film loading.



The YS-20 strobe connects to the Pocket Marine camera through a watertight Sea Loc fitting.

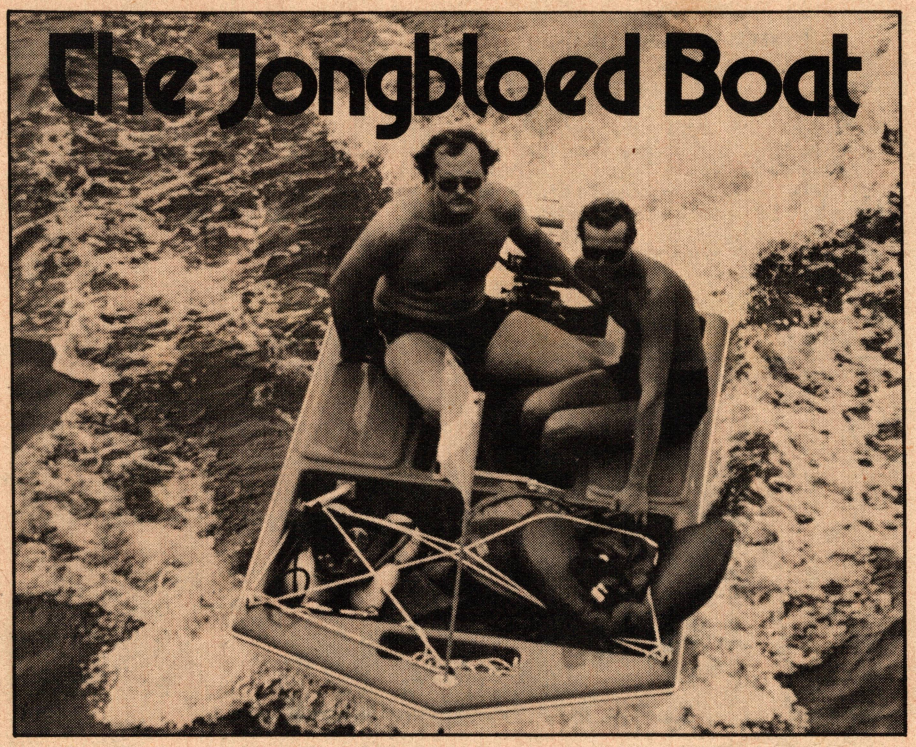


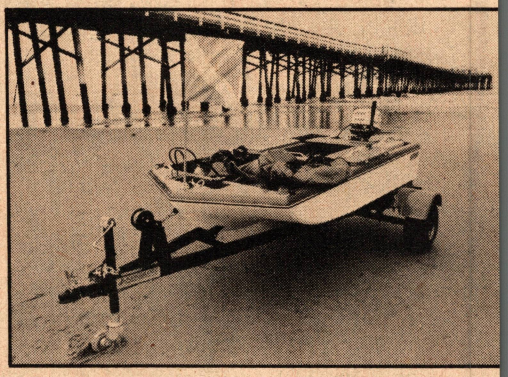
The system—Pocket Marine camera, YS-20 strobe, Sea-arm IV handle and close-up lens.

The Jongbloed Boat

A Water Toy That Works

Text and Photography by Eric Hanauer





It's only eight and one-half feet long, and doesn't look like a dive boat. But no one laughs at Bill Jongbloed and his scuba midget for long: the company he founded eight years ago has a solid record of achievement. It manufactures race car wheels which are run on tracks all over the world. So, when Bill Jongbloed shows you his Water Toys Boat and tells you it works, you listen respectfully, with an open mind.

Jongbloed (pronounced Youngblood) has demonstrated his boat for the Navy, the Coast Guard, and Scripps Institution of Oceanography. At Scripps, the surf was breaking six feet on the day he launched from the beach. After the demonstration run he asked officials what they thought of the boat. One volunteered that he was impressed, but he wasn't sure if that was because of the boat or because of the way Jongbloed handled it. Bill confessed to me later, "That was the first time I had ever launched the thing through surf."

The Jongbloed Water Toys Boat was conceived out of Bill's frustration. He wanted a two man dive boat which could be transported easily, carry a lot of gear, and perform well with a small outboard. Since no available boat met those specifications to his satisfaction, Jongbloed decided to build one. He hadn't ever built a boat before, but had made fiberglass car bodies and airfoils, and felt his knowledge of race car aerodynamics would carry over into boat building. Besides, he had grown up on Southern California's beaches and had spent enough time diving to know the demands of a personal dive boat.

From a distance, it looks like a radically scaled down Boston Whaler. It's only 8 feet 6 inches long by 4 feet 4 inches wide. Bill made it that small to fit inside a van. It will carry the load of a ten foot inflatable boat, however, because it lacks the pontoons of the rubber craft, which encroach on floor space. The hull is basically a flat bottom with a center keel and chines near the stern. The rugged, hand laid fiberglass body is filled with urethane foam, which makes it virtually unsinkable. "It has a higher ratio of foam to displacement than the Boston Whaler," Jongbloed states. He adds that, like an inflatable, it can be full of water to the gunwales and still support its crew.

The compartmentalized deck gives the boat rigidity, in addition to providing organized storage. There are seven compartments, each designed for a specialized purpose. Starting at the bow, the anchor well will hold a folding anchor and 150 feet of nylon line. Behind it is a large open compartment which can accommodate up to six scuba tanks or a combination of tanks and equipment bags.

A pair of covered chambers along the sides of the boat double as passenger seats. A tray under the hinged lid will carry sandwiches, wallets, or any dry material. The area below the tray can serve as an ice chest, insulated by the urethane foam. Between the seats is a footwell for driver and passenger, and also space for the gas tank. Finally, a pair of open compartments at the stern will hold additional dive gear. All sections have drain holes, leading to a common drain at the stern with a self bailing valve.

The boat weighs only 160 pounds without the engine. Jongbloed expects Coast Guard approval for a 700 pound maximum payload and a 16 horsepower engine, although he will recommend no more than 10 horsepower. He reminded me the craft was not built for speed, but for carrying capacity and stability.

The boat was designed to be carried inside a standard domestic van. As a matter of fact, two of them can be stacked inside, on an optional carrying frame. For those who prefer to tow it, a tubular steel trailer is also available.

The specs sounded good, but the proof is in the performance, so I joined Bill at Newport Pier for an early morning dive. We loaded the boat with three tanks, full ocean gear, and all the essentials plus one luxury: ice and a six pack of beer for the trip home. The total weight, with passengers, was well over 600 pounds. Launching was a snap through the gentle two foot shore break. Jongbloed opened the throttle and the boat surged ahead, but he wanted more speed to demonstrate what his machine could do. We both moved up to the bow until it caught a swell and went up on a plane. It stayed up, skimming the surface at 20 miles per hour as we moved back to our seats. The ride is very much like that of an inflatable: Stable, but wet and rough. Unlike an inflatable, the diver's bottom comes down on hard fiberglass instead of a soft pontoon. Seat cushions provide welcome padding.

The seven and three-quarters mile trip to Cameo Shores took just over 20 minutes. Once there, we anchored and prepared to dive. The tanks preceded the divers into the water, hung on a line to allow more room in the boat. After donning mask and fins, we entered the water with a backward roll.

(Continued on Page 96)

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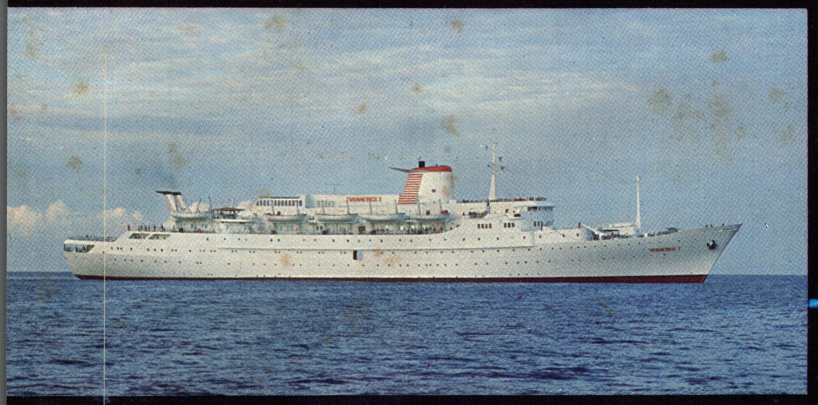

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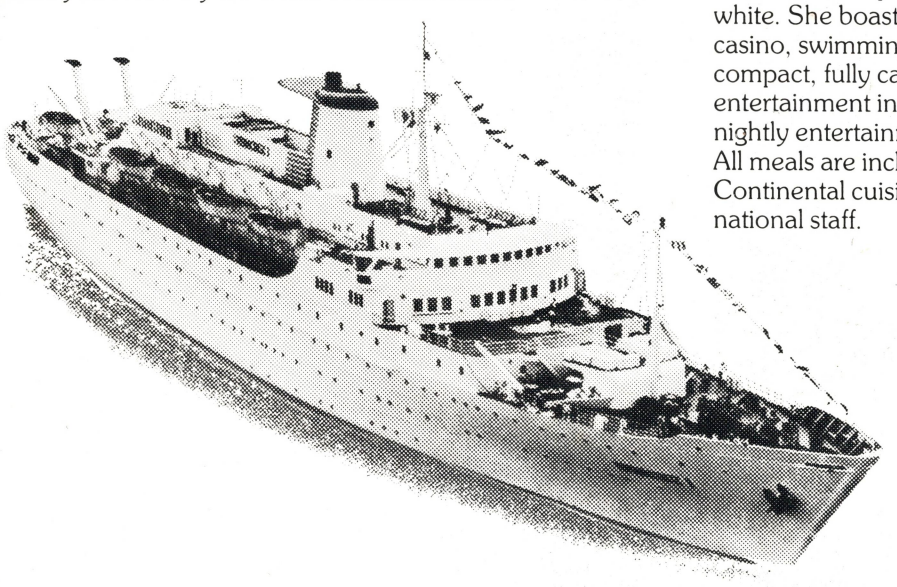

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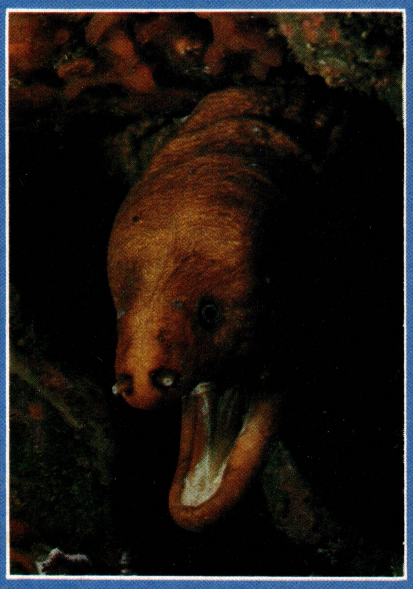
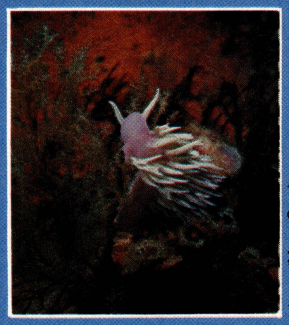
SECTION

NEW ZEALAND
Land of the Kiwis

By Marty Snyderman





photos/Marty Snyderman

"Bloody good divin' straight away here, mate. Keep an eye out for the dolphins and the kingees. The dolphins 'll be chasin' the kingees. Kingees be chasin' the trevalli. Trevalli be chasin' the maomaos. And don't get hit on the bean by a gannet! You might see a marlin. Bloomin' crays be in every pocket in the reef, mate, if I ain't been there first. T'is true mate! Tea in two hours and I'm serving crays. After you mate, whenever you're ready."

I could credit that statement to any of my New Zealand dive buddies, John Hallam, Dennis Corbett or Colin Petty. With a twinkle in their eyes, all said that or something similar and all served a delicious lobster dinner in just a couple of hours. And better yet, in addition to dolphins, kingees and maomaos, they showed me humpback whales, mola molas (ocean sunfish), enormous salp chains and much much more.

And bloody good divin' it was. Without question, the waters of New Zealand provide diving that is as colorful and adventure-filled as anywhere on earth.

I had always wanted to visit New Zealand, "the land of rugby, racing and beer." The scenic countryside, the rugged mountains of South Island, the fjords, the waterfalls and the wildlife are all legendary. And everywhere I went the air was so fresh and full of honeysuckle that I just wanted to inhale without ever stopping to breathe out. But I had no idea that the variety of marine life and the seascape easily equaled the beauty of the dramatic landscape and wide open country. And how about this one? We dove not on coral reefs, but in kelp! *Durivillia* is the generic name for New Zealand kelp, according to Kelco biologist, Ron McPeak. It is quite similar to the bull kelp found on the West Coast of the United States. *Durivillia* is beautiful, quite thick and grows to a depth of almost 100 feet. The vertical, rocky drop-offs, so common in many of the dive sites, are carpeted with it.

And, we found abalone as well! New Zealanders call their abalone *paua*, which is a Maori Indian name. The abs are small by California standards, but tasty nonetheless.

If my dive buddies, all of whom are native New Zealanders, had not called sea urchins, "sea eggs;" yellowtail, "kingees;" and grouper, "groper;" I might have sworn I had just discovered a new California Channel Island.

For anyone who believes I am talking about kelp growing in the South Pacific because I did, in fact, get hit on the head by a plummeting gannet, rest assured that Auckland, New Zealand's capitol, is almost as far south of the equator as San Diego is north. Year-round water temperatures in the northern, and therefore warmest, part of New Zealand vary from about 70°F in the summer to about 50°F in the winter. Of course, because New Zealand is in the Southern Hemisphere its seasons are the opposite of ours: When it is winter here it is summer there and vice versa.

The flight from Los Angeles to Auckland via Air New Zealand takes 14.5 hours. During our trip we enjoyed excellent service from a flight crew that was as intrigued by our interest in diving New Zealand as we were. After two meals, numerous snacks and an in-flight movie, we landed in Auckland. Immediately we began prepar-

(Continued on Page 66)

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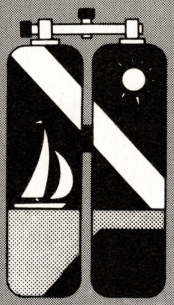

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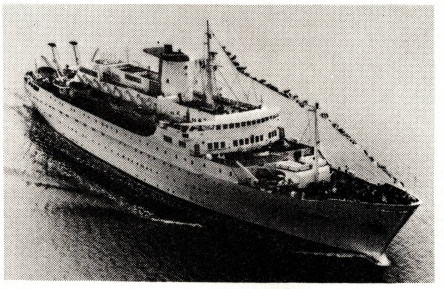

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See & Sea Travel has scheduled four Caribbean Photo Seminars for 1982. These one-week seminars will be held aboard the *Isla Mia* in Belize and the *Heddy* in Roatan.

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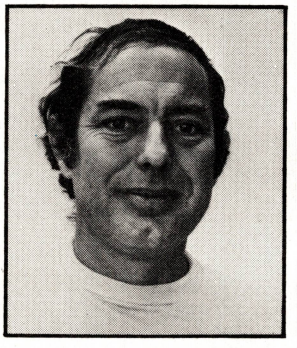

presentation and lead a seminar on selected topics. These will include: How to Photograph Those Elusive Fish; Working With Underwater Models; Special Effects; and others. The dates are: Roatan, February 20-27, April 17-24; Belize, February 13-20, April 10-17.

For more information contact: See & Sea Travel Service, Inc., 680 Beach Street, Suite 340, San Francisco, CA 94109.

San Salvador

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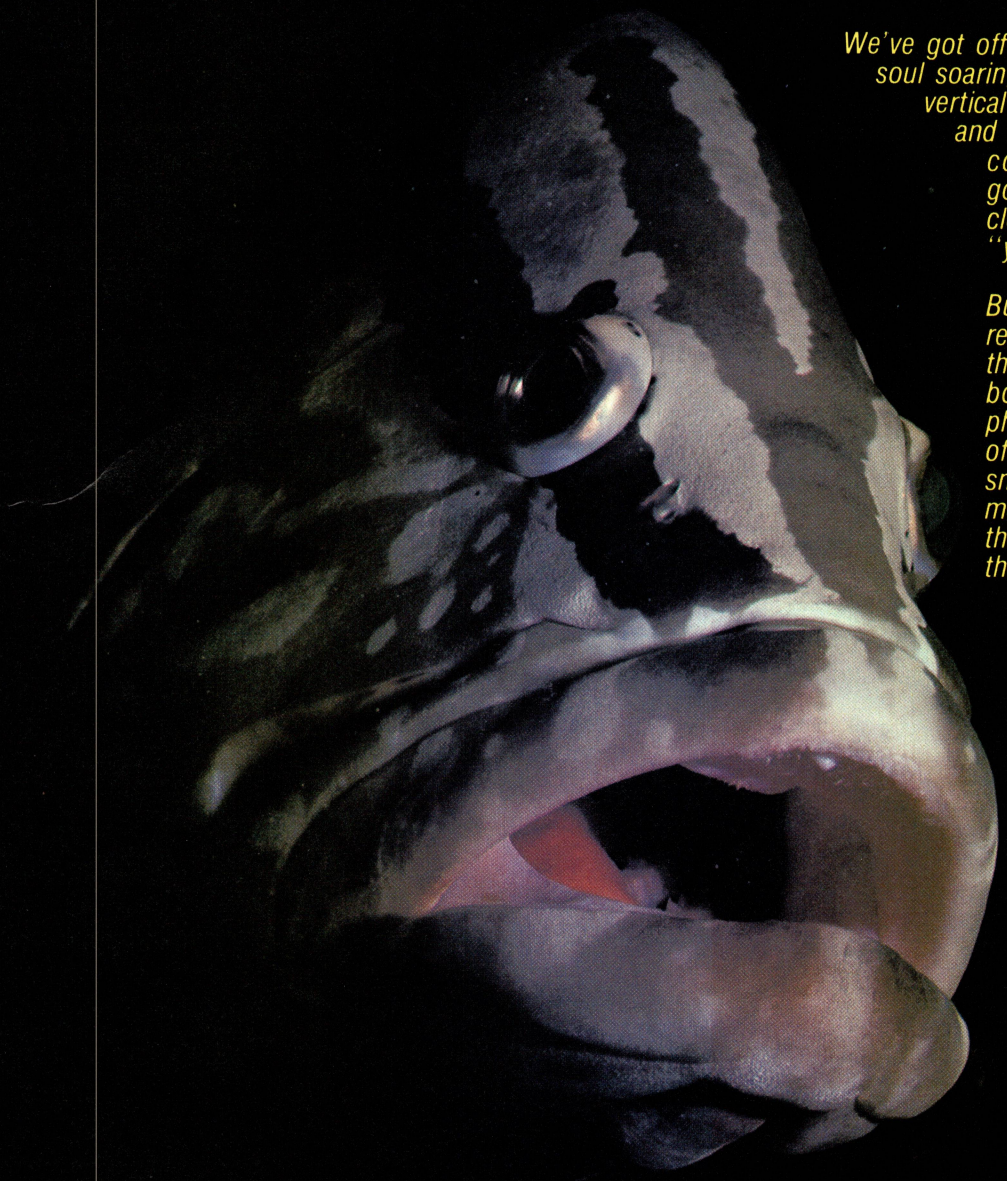

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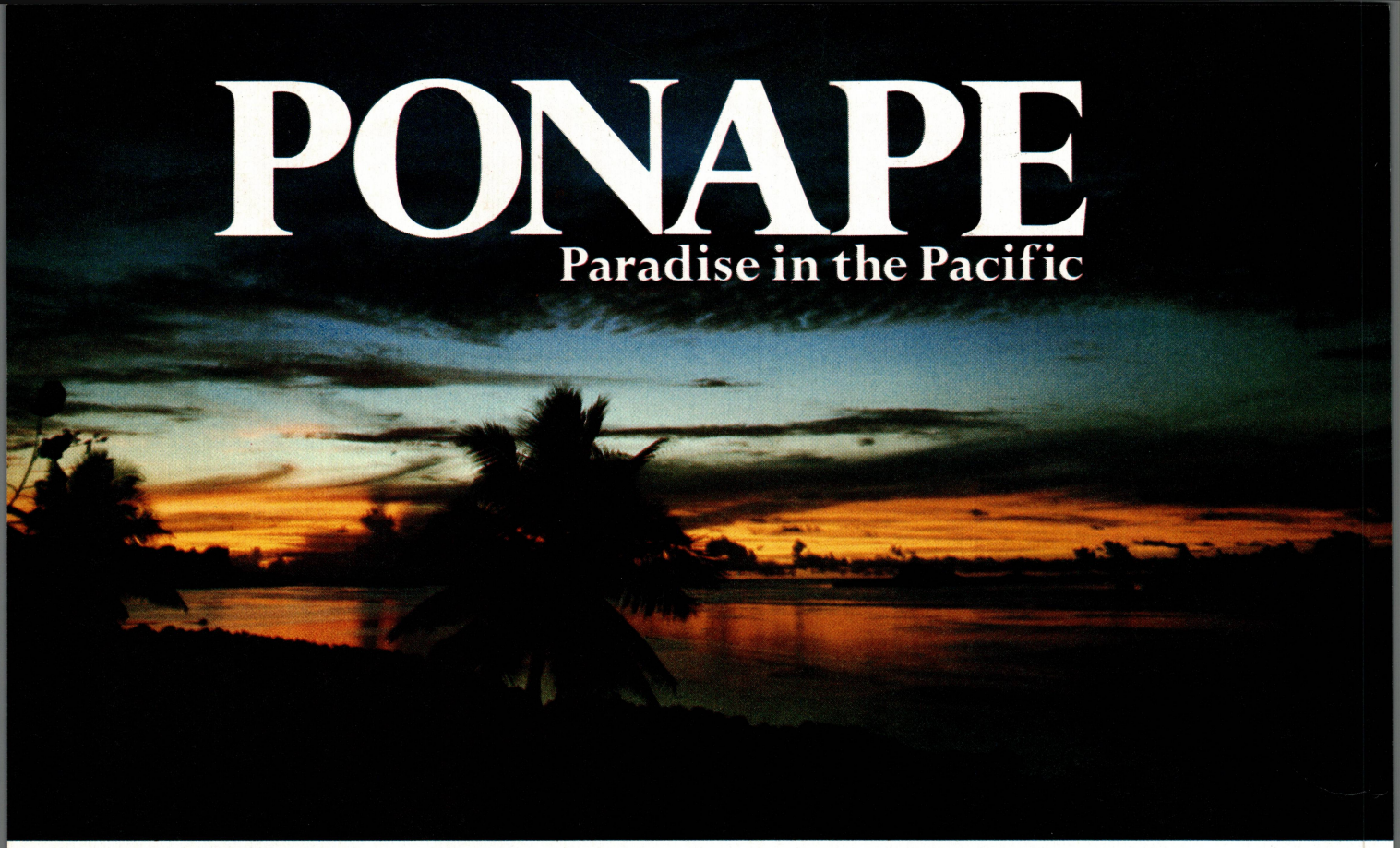
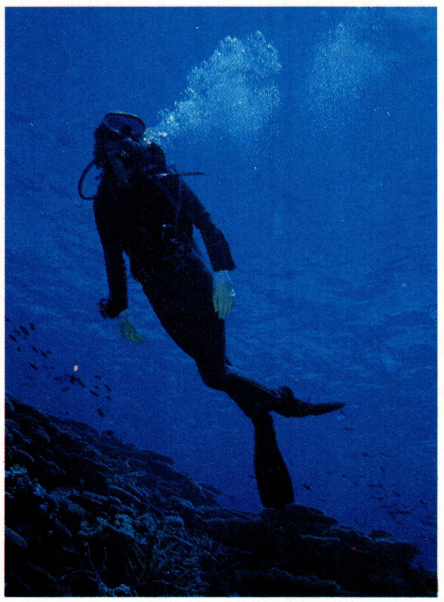
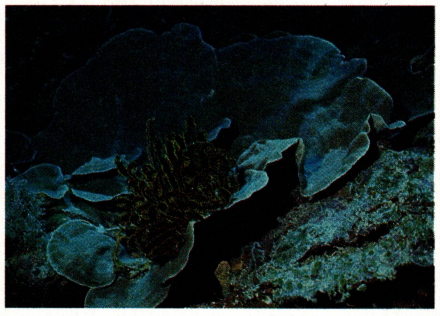
PONAPE

Paradise in the Pacific



Text and Photography by Rick Tegeler





Above, a diver explores the warm, clear, prolific waters typical of the outer reefs of Ponape. Upper left, a brilliant yellow crinoid common to the reefs of Ant and Ponape. Left, a striking yellow and black crinoid perches on a large plate coral.

Ponape. Jewel of Micronesia. Overshadowed in fame by her westerly neighbor Truk, this marvelous wonderland is beginning to experience the fanfare and acclaim that are justly hers. Easily accessible by Pacific standards, courtesy of thrice weekly Continental Air Micronesia flights from Hawaii, Ponape offers an array of facilities not found in many more traveled ports-of-call in the oceans of the world.

Ponape International Airport is 6200 feet of crushed coral which is generally covered by an inch of water, mud and miscellaneous domestic animals. This miracle of modern aviation, together with the one building terminal structure which seems to be in a continual state of repair and rebuilding, is dominated by massive Sokehs Rock. A majestically naked basalt bluff, it thrusts from the calm lagoon waters to over 900 vertical feet and is the single most famous landmark of Ponape. The protrusion of Sokehs can be seen from nearly all points on the north and east sides of the island. Like a silent sentinel, Sokehs guards the harbor and major town of Kolonia, where over 50 percent of the island's 11,000 people live and work.

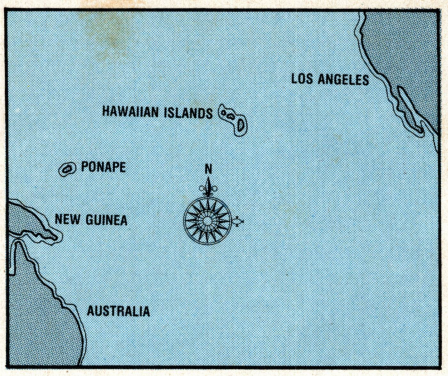
Journeying 11 miles, and what seems like centuries of history, from the airport via a road that defies description — and sometimes gravity — one arrives at the Village. This unique hideaway blends

the optimum in modern convenience and comfort with indigenous rustic charm. Superb cuisine, courtesy of the staff, and an exquisite location, providing unbelievable storybook views, complete the package that Bob and Pattie Arthur wrap with the warmest of hospitality, making their guests feel as if they were old friends and personal house guests. Fourteen spacious bungalows and a main dining area and bar are perched atop the lip of an extinct volcano and are incorporated into the surrounding jungle so effectively that you are certain Bob Arthur was consulting with Mother Nature herself when he designed and built this remote paradise retreat. One does not find, or need, the abhorrent clutter present in similar resorts elsewhere. There are no room numbers on the doors or written checkout instructions on the walls. All the lighting and wiring is hidden in the natural construction so when flipping the light switch on one shouldn't be surprised when illumination comes from within the overhead hanging planters. Each bungalow is complemented by two queen size waterbeds, an overhead fan, rattan furniture and an awesome view of the waters and the reefs below. The Village is an adventure; in and of itself worth the visit to Ponape.

Nan Madol or, "place of spaces" as it is literally translated, was a city consisting of approximately 100 artificial and semi-artificial islets built of naturally columnar basalt, probably carved from the area contiguous to Sokehs Rock. It is supposed that these huge stones were transported to the site, slung beneath oversized rafts, then manually maneuvered into place by rolling them up ramps of crushed coral. This crushed coral was then used for the foundation of the next islet.

Originally conceived by two high chieftain brothers around 1200 A.D., Nan Madol was designed to incorporate areas conducive to all aspects of the advanced Ponapean civilization of that time; from islands for governmental use to islets for worship and burial. Nan Madol was constructed just inside the southeastern point of the fringing barrier reefs to take full advantage of the windward protection afforded from the prevailing westerly seas. Resembling early Cambodian temples in design, about one square mile of shallow reef was laid out into inter-connecting canals between which the small islands were constructed. On these were the city structures proper.

History has it that an awesomely devastating typhoon overwhelmed the low-lying city and drove the surviving inhabitants from Nan Madol circa 1800. This natural disaster, together with the diseases carried to the island population by the encroaching European colonization of the period, so decimated the local population that maintenance of the reef community was no longer feasible and soon native mangroves and silt covered all vestiges of the city until partial excavation by the Germans in 1907.



Tropical thermal currents, born in the equatorial heat and nourished by the dense jungle, plus the high island topography, combine to create an endless circle of heat-cloud-rain. This meteorological phenomena was enough to discourage the Allied invasion of Ponape in early 1944, when the American fleets sailed through the Marshalls and Micronesia on their way to destiny. While Japan had significant fortifications and equipment on Ponape during the Pacific confrontation, the Allies needed bases that provided the luxury of semi-predictable weather for the then new B-29 bombers. Thus, the daily rain was the savior of the island and its communities and Ponape came through the entire conflict relatively unscathed.

Traveling to the dive sites one must traverse one-half of the island's inland waterway as the reefs are located at the far southwest portion of the outer barrier reef and most of the facilities are on the north and northeast sections of Ponape. Because the prevailing weather is from the northeast and east, the ocean outside the reef at the dive site is generally calm, providing easy access and exit in addition to comfortable dive conditions.

Nearly 100 years ago the entire fringing reef was decimated by the seemingly omnipresent crown of thorns starfish. All but five percent of these reefs still lie dormant or, at best, are only now showing the very first signs of ecosystem rejuvenation.

Inside the encompassing barrier reef the inner shallows are, for the most part, devoid of life. However, if the majority of the Ponapean waters still struggle to regain undersea life, the remaining five percent teems with existence to such an extent that other world class dive locations pale by comparison. Only the ocean side of the reef is dived and this area extends from the surface breaking reef top to the sheer bottomless drop-off. Spanning eight to ten feet, umbrella corals dominate the underwater landscape. These huge colonies of marine organisms are so fragile that the mere touch of a hand can be enough to fracture their outer edges. Curious reef sharks of several varieties and their larger pelagic cousins are numerous as are the magnificent mantas, bellicose barracuda and many other deep water creatures usually not found in such close proximity to shallower waters. Over 350 species of tropical reef fishes, plus substantial numbers of plants and other animals have so far been identified on this reef, bearing witness to the prolificacy of the microscopic food chain.

Another 12 miles from the westerly side of Ponape is Ant Atoll. Here a diver has the rare opportunity to count himself as one of the first 100 visitors to this underwater wilderness. Reachable only by boat across open ocean, the primary attraction in this small lagoon is the inlet pass that separates the calm interior waters from the surrounding ocean. Though small in dimension — less than a mile long, one-fourth mile across and 110 feet deep — the waters in this artery to the ocean run at up to seven knots during peak tides, evidence of the prodigious quantities of water moving through its confines. The sides of this unique trough are sheerly vertical and abound in huge lettuce corals, crinoids and a kaleidoscopic array of tropical reef dwellers. At the ocean outlet and at the bottom of the channel, the larger marine animals cruise slowly as they anticipate the daily feeding provided by the tide changes. Drift diving at its best and the excellent chance to witness large schools of pelagic animals in close proximity, make Ant truly an adventure.

The incredible fragility of these new reefs must be experienced to be believed. To the tremendous credit and foresight of the dive community on Ponape, there are currently definite parameters within which visitors to the reefs must operate. Most resort and dive operators preclude beginners and novices from diving the outer reefs. When novices and/or most divers venture out they are closely attended by native guides so as to protect the corals and the divers from inadvertent intimacies. Boat operators and fishermen are advised to use extreme caution when anchoring on these outer reefs and, if possible, are encouraged to seek their fish in different, just as plentiful, locations on the reef. With this close scrutiny and attention to detail the dive community can look forward to decades of enjoyable underwater adventures on Ponape and possibly experience the rebirth of an entire reef community.

Ever wonder what Hawaii or Tahiti must have been like 100 years ago? Visit Ponape and find out.

NEW ZEALAND

(Continued from Page 61)

ing to visit Great Barrier Island with Colin Petty, the owner of Pakuranga Dive Shop in Half Moon Bay, Auckland. From there we would go on to visit the famous Bay of Islands with Dennis Corbett, owner of Pahia Dive Inn in Pahia.

Both Dennis and Colin showed me a great time. The facilities, including beautiful charter boats and a variety of rental equipment, are excellent.

Before I ever donned a wetsuit I watched humpback whales swimming across the channel between Pahia and Poor Knight. My wetsuit went on in record time and although I saw no whales underwater I did manage to photograph a mola mola in the open water channel. Overall the marine life is more similar to Southern California than any other area I have dived, but there were noted exceptions as well. There were numerous parrotfish, large sponges, hog snapper, and wrasse that I associate with more tropical waters. Everywhere there was evidence of the food chain at work. Large schools of inch-long baitfish constantly boiled across the surface, hotly pursued by schools of maomaos. Maomaos are especially beautiful fish that occur in either of two colors, irridescent pink or blue. The average school contains over 1000 fish and the sunlight sparkling off of their brilliant scales is a sight not easily forgotten. Trevalli and yellowtail also worked the baitfish as well as the maomaos. Next came the dolphins. We had one glimpse of a large shark, a bronze whaler. Thresher sharks are commonly sighted here as are world class marlin. The gathering of large marine life was phenomenal. The baitfish never had a chance below water and that doesn't even consider the constant attack from the air on them by gulls and gannets.

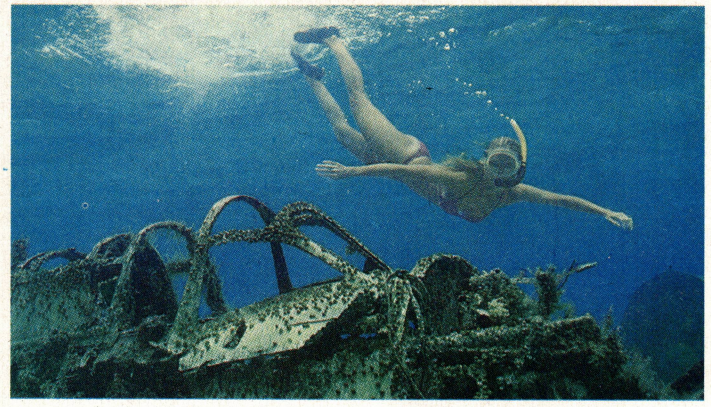
Out of all the diving we enjoyed, Taravana Cave, Northern Arch, Nursery Cove, and Arid Island stand out to me as the most spectacular. Taravana Cave, at Poor Knight Island, can be penetrated to over 500 yards. The mouth is about 100 feet wide and is open from the sandy bottom at 120 feet to the roof, which is only 60 feet below the surface. The walls are covered with brilliant yellow sponges, anemones and gorgonian corals. Numerous sculpin and the most cooperative of eels rest along the walls. The morays of New Zealand look much like the eels of Southern California to my eyes but rather than lurking in the crevices they often prefer to rest totally in the open.

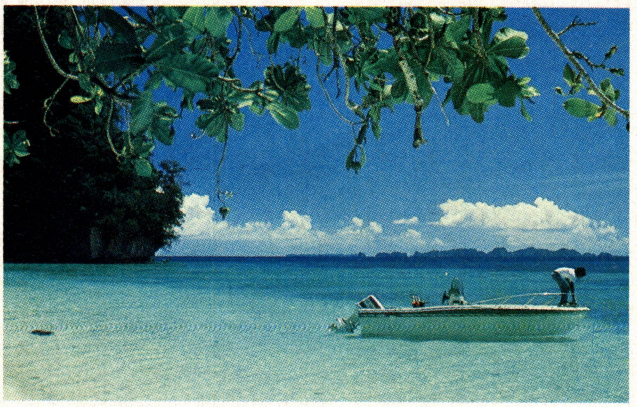
Northern Arch, also at Poor Knight, is a cut that penetrates the entire island. The sheer walls are covered with nudibranchs, sponges, kelp and colorful invertebrates, while the nearby open water is teeming with maomaos and occasional eagle rays.

Nursery Cove is a well protected area in which divers need not go deeper than 20 feet. It is loaded with damselfish, wrasse, bright red pig fish, leatherjackets, nudibranchs and beautiful kelp. For shallow afternoon diving, few places offer the beauty and variety of this spot, especially on sunny days when rays of sunlight flicker through the kelp and the colors are bright because it is so shallow. Arid Island, a wash rock off of Great Barrier Island, is extremely sheer. The crevices are filled with lobsters, but what I saw there during the first half of my dive consisted mostly of John Hallam's fins. Once John's goodie bag was full of crays we went off to see this wonderful area — rich in invertebrate and fish life.

Along with the best of diving and the beautiful landscape, the people of New Zealand are absolutely delightful. They openly welcome their visitors and show a sincere interest in more than just the Yankee dollar. New Zealanders, Kiwis as they affectionately call themselves, are intensely proud of their homeland, especially their world famous rugby team, the All Blacks. Most Kiwis are firmly convinced that the All Blacks could beat the Pittsburgh Steelers at anything and everything from Chinese Checkers to football and they will eagerly tell Americans about their convictions. And, in spite of the fact that we supposedly

WAR & PEACE.





Under the placid surface of Truk lagoon lie miles of wreckage from World War II. Warships, planes and torpedoes. All are now silent and coral-encrusted.

These contrasts make a diving vacation in the Truk atoll unforgettable. Here's just a sample of our exciting tour packages.
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TRUK, PONAPE. 16 days/$1650.* Stay at the Truk Continental and Ponape Village. Plus one night in Honolulu. Spend nine days underwater sightseeing on two exotic Micronesian islands. (Sea & See Travel)
*Prices are per person double occupancy. Airfare not included. Subject to change without notice.

For complete details on diving in Micronesia, call your travel agent, dive shop or Continental. Or send in the coupon for our free color brochure.

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CONTINENTAL AIR MICRONESIA

speak a common language, the Kiwis have great fun pointing out that it is they, not us, who speak the King's English. The King's English, begging his royal pardon, can be a little confusing to American tourists. Some of my favorite examples were road signs stating, "greasy when wet" and "deceptive bends." A "smash shop" or a "panel pounder" is an auto body shop. Everything is either bloody or bloomin' and everyone is your mate. And, when asked if you would like to, "come to tea" you had better go if you plan to eat a meal. While tea can mean a cup of tea, it can also mean lunch or dinner. Coffee is served white or black, meaning with or without cream. If you ask for cream, however, you are liable to get a glob of whipped cream on top of your coffee. Accompanying the dish is a curious look and a smile.

As a whole, the independent-minded people reflect the qualities of the land and sea that is their homeland. They are hardy people and at the same time so friendly and helpful. They made me want to stay longer and certainly to plan a return trip as soon as possible.

SCUBACAMP TO ROATAN

Scubacamp will be returning for the 1982 season to Reef House Resort on Roatan Island, Honduras.

Thorough training in scuba, in which the campers have the opportunity to earn either basic, intermediate, or advanced certificates, is an integral part of each camp session. Diploma programs in sailing and windsurfing will also be offered, as well as informal lectures on tropical and marine biology. The campers will participate in field trips to various points on Roatan, will picnic on Fort Cay, dive in Port Royal Harbor and have a camp-out on the island of Barbaret.

Added to Scubacamp's program in '82 will be a live-aboard cruise on a sailboat.

Two two-week sessions start in mid-July. For further information, write to Thelma Clark, Scubacamp Director, 200 Ansel Road, Geneva, Ohio 44041.

DIVE/STUDY IN MICRONESIA

ED-U-DIVE's tours are designed to give divers and snorkelers an overview of three Micronesian islands, including history, geology and socio-cultural aspects. There is an emphasis on marine life study and appreciation.

Informal field study and evening slide presentations allow participants to learn at their own pace. Full day boat dives provide ample opportunities to dive, snorkel and explore the reefs and wrecks of Truk Lagoon, Palau and Ponape with a marine resource guide.

Tours are scheduled to leave in March, April and July of 1982. For itineraries, call or write: ED-U-Dive, Inc., P.O. Box 724, Libby, MT 59923; or call ED-U-DIVE's coordinator, (406) 293-6244.

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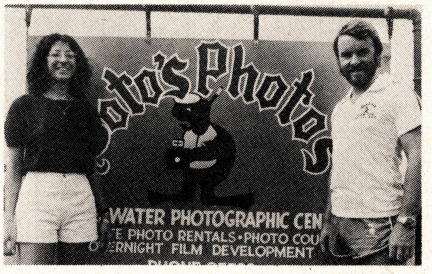
SOTO'S PHOTOS

The Bob Soto's Diving Ltd. outlet at the Cayman Islander Hotel, one of four such outlets, will henceforth be known as Soto's Photos. The shop will feature underwater photographic sales, rentals, instruction, repair and quick color slide processing.

A daily photo resort course is a special feature designed especially for Soto's Photos by manager, Martin Sutton. Sutton, along with his assistant Ahuva Zaid, develops the film and offers a critique.



Soto's Photos will also provide special services for snorkelers. Easy-to-use instamatic cameras are available for rental for those who want an underwater souvenir.

Daily afternoon dives specializing in photography will be conducted by Sutton, along with the photographic resort course.

POSEIDON/READ TO MICRONESIA

Gary Read of Rocky Mountain Divers, Lakewood, CO will lead his yearly Underwater Photography Tour to Micronesia departing on February 9. The tour will include five days of diving the reefs of the Palauan Archipelago and four days diving the wrecks of Truk Lagoon.

For further information call toll-free (800) 854-8334 or write to Poseidon Venture Tours, 359 San Miguel Dr., Newport Beach, CA 92660.

CRUISE FOR CREDIT

See & Sea Travel is offering a series of Caribbean dive trips to Cayman and Belize which will include a one week course in marine biology for credit. Designed specifically for scuba divers, the course will be taught by Dr. Jeff Marcus of Florida International University.

Captain Paul Humann will assist Dr. Marcus and the captain's slide show will be used as part of the evening programs.

The cost of these programs is $900 per person (not including air fare) and the dates are: Grand Cayman, aboard the *Cayman Diver*, Feb. 27-March 6 and Aug. 28-Sept. 4; Belize aboard the *Isla Mia*, June 19-26 and Nov. 20-27.

For more information contact See & Sea Travel Service, Inc.

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Sometimes, the most romantic words in life are the hardest to say.

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Cayman Kai Resort, on Grand Cayman's secluded North Side, offers everything a watersport lover could ever dream of. There are sheltered coves for waterskiing and swimming. And, perched on the edge of the island's North Wall, the scuba diving is among the best in the Caribbean. Cayman Kai offers assistance and equipment rentals for a full range of watersports, including scuba and underwater photography.

POSEIDON/SCHUTT TO BONAIRE AND PHILIPPINES

Poseidon Ventures is offering two special Underwater Photography Tours led by Paul Schutt of Helix Camera, Chicago, IL. An eight day, seven night program to Bonaire's Flamingo Hotel runs from January 2-9; and a 14 day program to the Philippines departs on February 20, with ten days unlimited diving from the 120 foot M/Y *Lady of the Sea* to the Tubbataha reefs. A five day, four night extension to Hong Kong will also be available on the Philippine tour.

For further information concerning these departures call (800) 854-9334 (toll free) or write to Poseidon Venture Tours, 359 San Miguel Dr., Newport Beach, CA 92660.

BRAC REEF HOTEL DIVE PACKAGES

The Brac Reef Hotel, on Cayman Brac, is now offering economical dive packages. The rates are $39 per person, double occupancy, EP, per day (3 day minimum). Rates include double occupancy accommodations, two one-tank morning dives, one one-tank afternoon dive, unlimited beach diving and one night dive. Group rates are available upon request.

For more information contact: Brac Reef Hotel, Cayman Brac, BWI, or the Brac Reef North American reservations office: 18361 N.E. 2nd Avenue, Miami, FL 33170; or call toll free (800) 327-6840 — in Florida call: (800) 652-9716.

DIVE IN AUSTRALIA AGENTS

Two new agents will represent Dive In Australia's tours to the Great Barrier Reef: Sea Safaris of Manhattan Beach, CA and Lawson Sea Sports of Houston, TX.

The existing operators, See & Sea Travel of San Francisco and Poseidon Ventures of Los Angeles, will continue to work closely with Dive In Australia.

For further information contact David Loughnan, Dive In Australia, P.O. Box 1111, North Sydney 2060 N.S.W., Australia.

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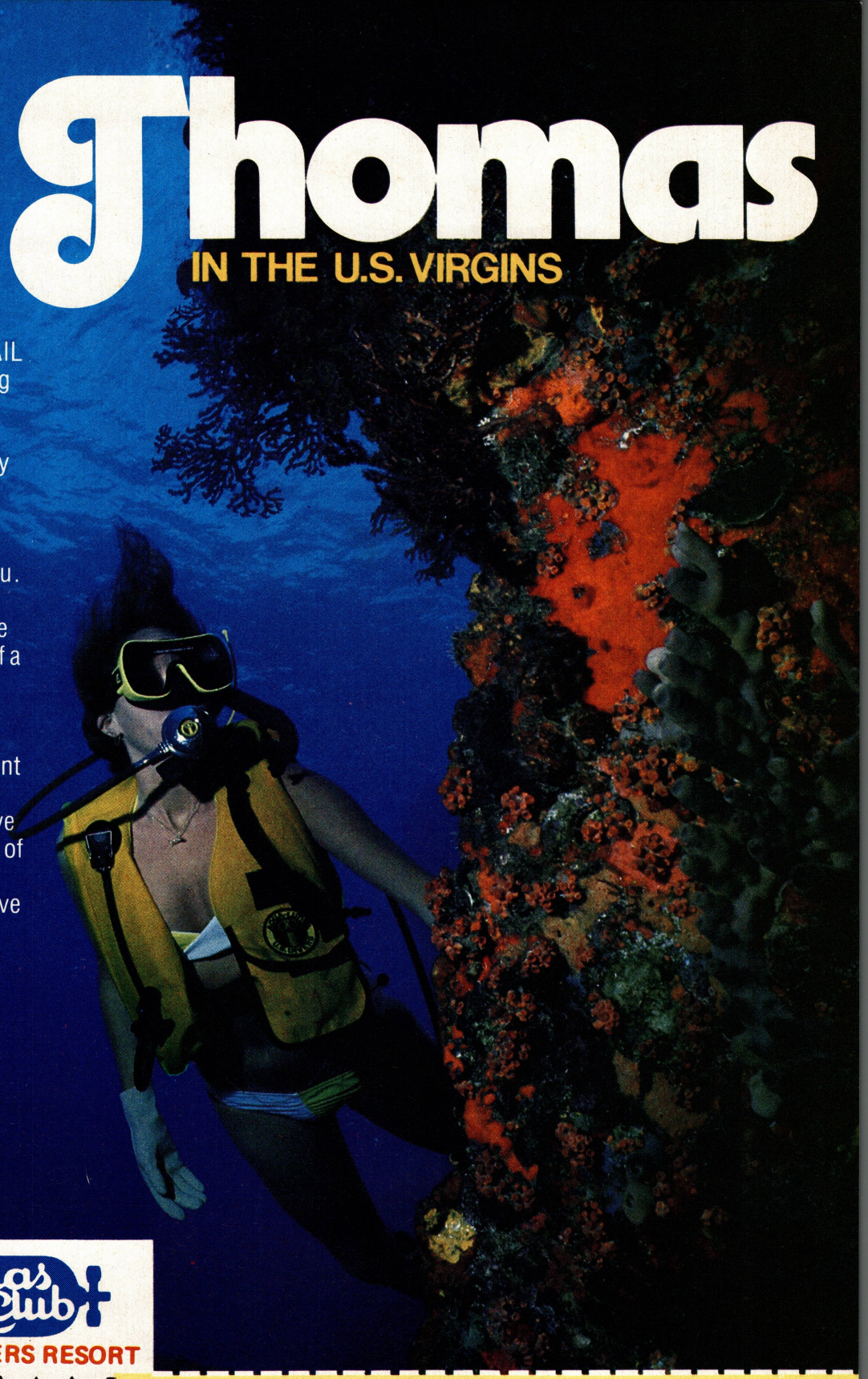

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St. Thomas Diving Club is the new home of the Jim & Cathy Church U/W Photo School. Weekly classes starting MAY 1982 and running all summer. Learn from the experts who wrote the book!

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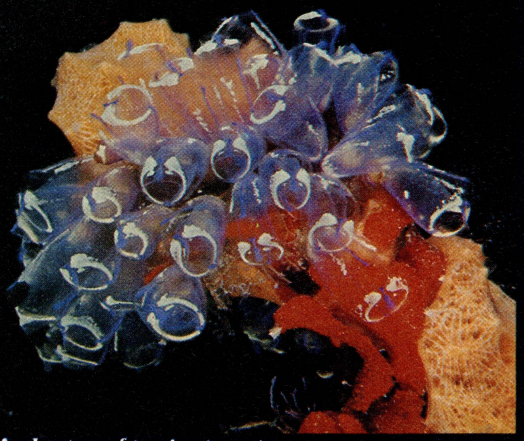
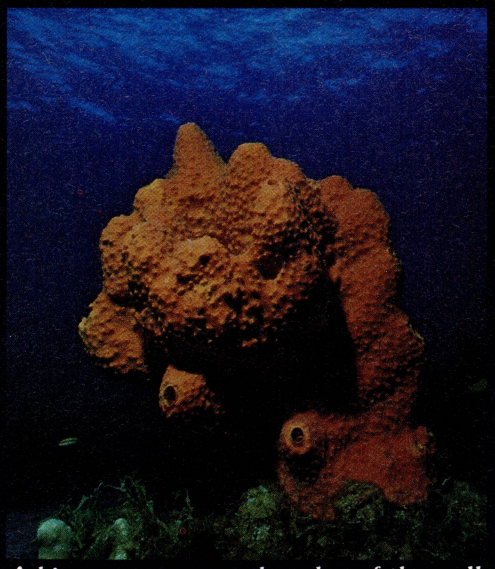
Shangri-la



A cluster of tunicates atop an orange sponge.

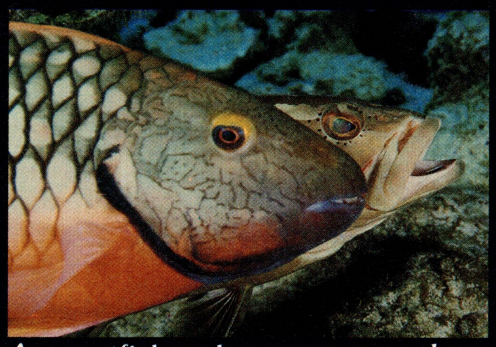
Two scarlet ladies entice customers to a cleaning station.



A bizarre sponge at the edge of the wall.

Dave Woodward, director of the U/W Photo Center, San Salvador Island, the Bahamas, poetically describes his favorite spot for underwater photography and enjoyment of the beauty which rests beneath these waters.

A finger sponge (right) juts out off the wall.



A parrotfish and a grouper up close.

Gay Woodward photographs a large finger sponge.

Far away in a distant land called San Salvador there lies a magic valley: Shangri-la! Hidden in the aquatic exterior of this ancient land, the valley waits, serene and lovely. It is a hanging valley, perched on the edge of the abyss; filled with the timelessness of the sea, and carved from countless generations of corals and algae.

The approach is made over a steep escarpment and as you drop over the edge and start your descent, time stands still and worries float away: You and the universe become one.

Beware, however, Ghengis Khan and his band of marauders! They will prevent your invasion if they can, for they patrol the verge like a Mongol scourge, robbing and plundering all travelers.

Do not remain in the valley too long! While timelessness may be good karma, the body cannot long withstand the onslaught of the spirits of the deep. You must return through the interface from whence you came so that you may, once more, reenter and experience: Shangri-la!

Text and Photography
by Dave Woodward

MAGAZINE MINUTIAE

By Spencer Campbell

Here is a call to the trivia buff,
To dig in the reference heap;
To seek and find, and commit to mind,
The trivia of the sport of the deep.

1.) As readers of SKIN DIVER Magazine,
We all know the editor Paul;
But who out there can remember the names
Of the men who started it all?

2.) And he had a friend Carl Kohler by name,
Who was anything but solemn;
Can you by chance call to name,
The title of Carl's column?

3.) In addition to SDM, there were
Diving journals we knew;
Think of things wet and pointed,
And try and remember two.

4.) Before all the tales of Jacques Cousteau,
An Italian diver was shook,
By the beauty of a submerged continent,
Can you give me his name and book?

5.) Then somebody wrote us a manual,
And he gave us a triangle plan;
To practice our diving safely,
Can you name the book and the man?

6.) Who remembers the name of the suit,
That claimed you could enter with haste?
It was dry, it was brown, and you sealed it up,
With a ring that rolled at the waist.

7.) A popular snorkel of champions,
At the crest of the spearfishing game,
It was green and narrow and soft in the mouth
Can you remember its name?

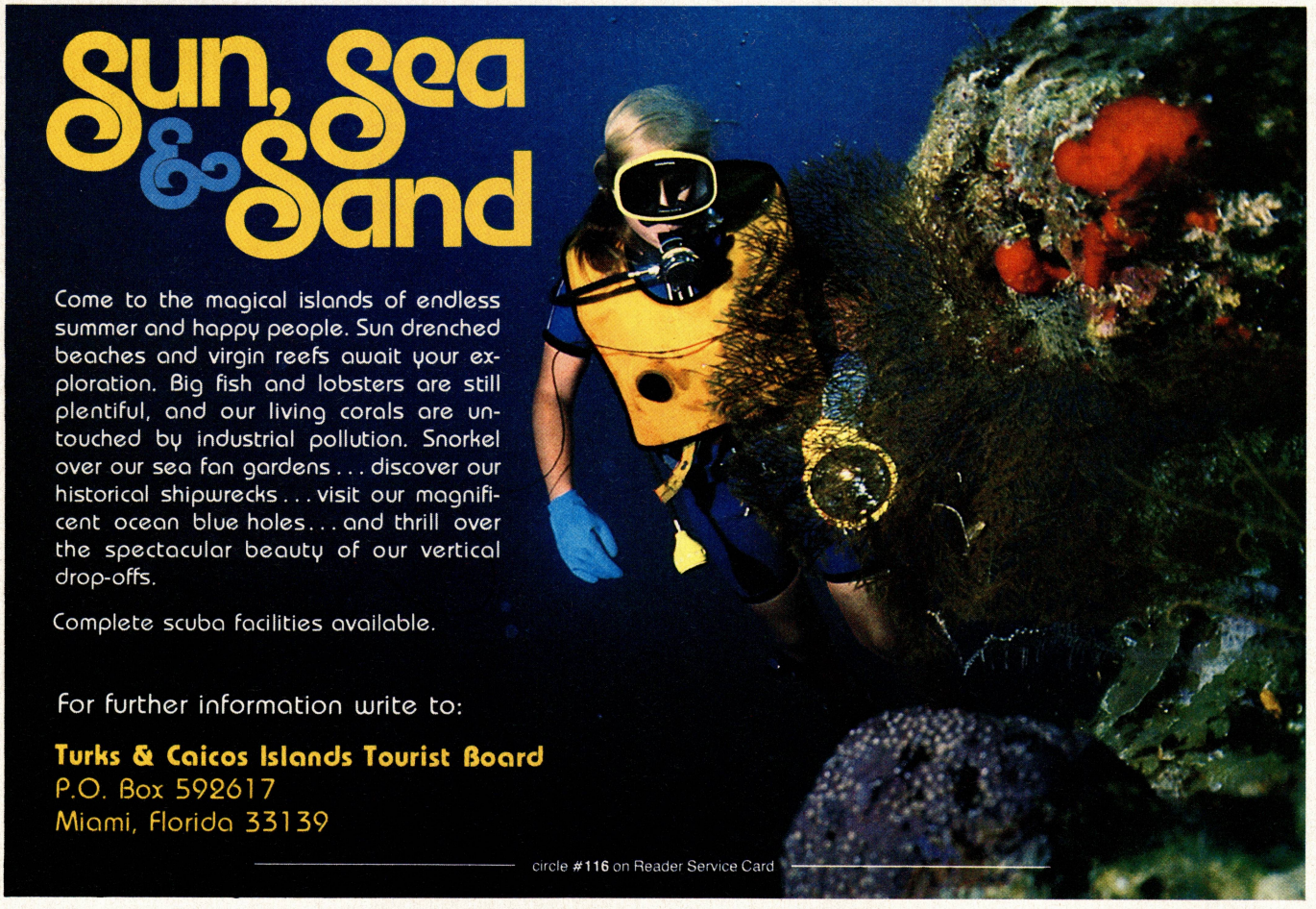
8.) When speaking of pool training units,
Do any remember the one;
That delivered more air than expected,
Oh, it's right on the tip of my tongue!

9.) We all know the famous E. R. Cross,
The master of Technifacts;
But who can name his commercial school,
Before it moved up to Jack's?

10.) Regulators, regulators, everywhere,
The Aqua-Lung comes of age;
Can you name the one with two hoses of blue,
Hope mouthpiece, and single stage?

11.) Now modern regulators with space age dynamics,
Provide us with much breathing ease;
But who can remember the name of the unit
That claimed that it breathed like a breeze?

The answers to this little brain-teaser,
are found in the back of the book.
On page 97 your quest will be over;
Refresh your memory with a look!



Cave diving. Not for everyone.

But you can do it with the famous Underwater Explorers Society!

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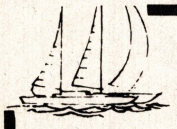

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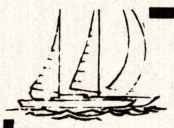

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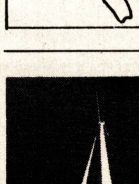

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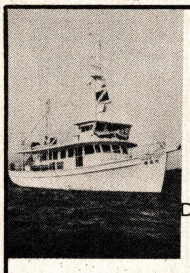

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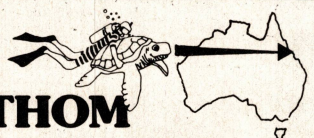

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SPECIAL NOTICE

D.E.M.A.

Famed underwater archaeologist ROBERT MARX will be at the Diving Equipment Manufacturers Assn. convention, Jan. 23-26, San Antonio, TX, to introduce and autograph his fantastic new book, THE TREASURE OF *Nuestra Senora de la Maravilla*. Come by Garrett Electronics Sea Hunter Booth 171. (See Garrett ad this magazine.)

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Technifacts

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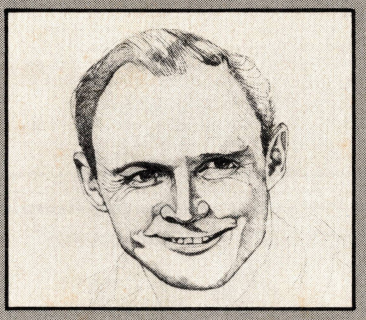

A great deal of the world's history lies lost beneath the surface of our watery planet. It has only been since the development of scuba, in comparatively recent years, that the full scope of this underwater treasure has been realized. Finds by divers have ranged from tremendously valuable cargoes of gold, silver and jewels to more mundane but equally fascinating stone implements of prehistoric man and the fossilized remains of plants and animals eons older than the earliest man. But, only a small fraction of man's history, lost or thrown into the water, has been found and recovered for study.

DIVING FOR HISTORICAL OBJECTS

For all of history man has been a wanderer. In his wanderings he has lost things underwater. It follows that the best place to look for those things is where a concentration of wanderers occurred — on the banks, shores, bays or harbors of the world's waterways. Marine battlegrounds, whether offshore or along the shore, are also potentially good sites. How to find these areas of concentration is one of the secrets of successful historical diving.

There are several ways a diver can find potential sites. Each local area will have its own source of information. Generally these will include, but not necessarily be limited to, the following:

1. Local divers and fishermen who either spend a lot of time underwater or who trawl a great deal for fish or other seafood. Many great underwater archaeological sites have been discovered by science through working with local fishermen.

2. Local history books — best source, the local library.

3. Logs and records of early explorers — local library and book stores.

4. Public records — city, county and state archives.

Spanish Cove

Grand Cayman, British West Indies

Photo: Nancy Sefton

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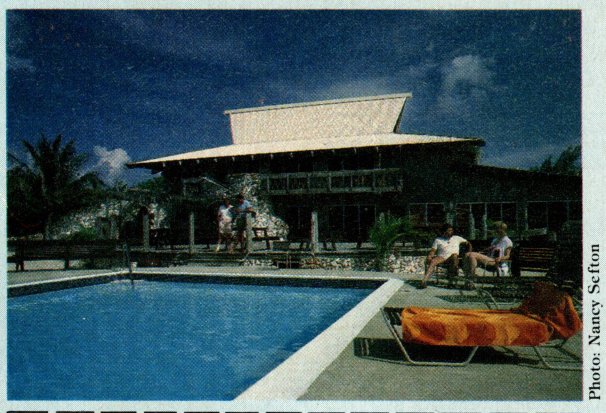

Photo: Nancy Sefton

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5. Newspaper reports of events — local newspaper files.

6. Charts and maps of the area under study.

7. Museums — their files and records.

8. Historical society records.

When researching in the records outlined above, divers will be looking for any indication that a concentration of people occurred along a shoreline of lakes, rivers, bays, harbors, or the ocean. Old railroad and highway bridges that cross streams and lakes are likely places for lost or discarded objects. Sites of old piers or docks, particularly ferry landings, are also places of possible finds. Fishing camps; parks adjoining waterways; sites of wrecks (indicated by wreck symbols on nautical charts), boat moorings or anchorages (also indicated on charts), and old river crossings used by early pioneers are all possible sites.

SEARCH TECHNIQUES

Techniques used by divers might include visual search, probing and electronic methods. For this Technifacts only the firs: two will be considered.

Visual search methods include swimming search patterns similar to those discussed in previous Technifacts. Both circular and jack-stay methods are useful. Another method that might be successful, particularly in clear water, is surface swimming — be alert for shadows or small mounds in a sandy or muddy bottom that might indicate buried objects. The sites of old piers may be indicated only by the stubs of rotted pilings, barely visible above the mud or sand.

You can also use a look box or small glass bottomed boat. These have the advantage of allowing much more time for the search than a diver could.

A metal probe can be made from a three to four foot long piece of one-quarter inch diameter, spring steel rod with a short (5 inches long by one-half inch diameter) pipe handle welded across the top of the probe. The probe end can be pointed, but some people prefer to weld a small steel ball over it. When the diver pushes the probe through a muddy or sandy bottom a buried object will be felt. With experience, the diver will be able to tell the nature of the object as well as its size and shape.

It is important to differentiate between the finds of the treasure hunter and the average sport diver and those of the organized, scientifically disciplined archaeologist. In spite of the vast differences between them, the sport diver and the archaeologist have one thing in common. They are both searching for things out of the past. The sport diver should be aware that every object found underwater is potentially of historical interest. Some of his finds will be of historical importance and a few may well be archaeological treasures.

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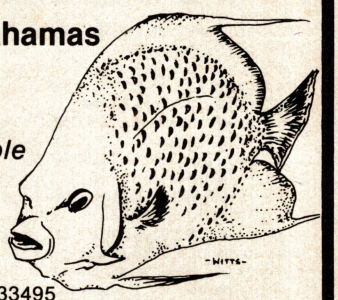

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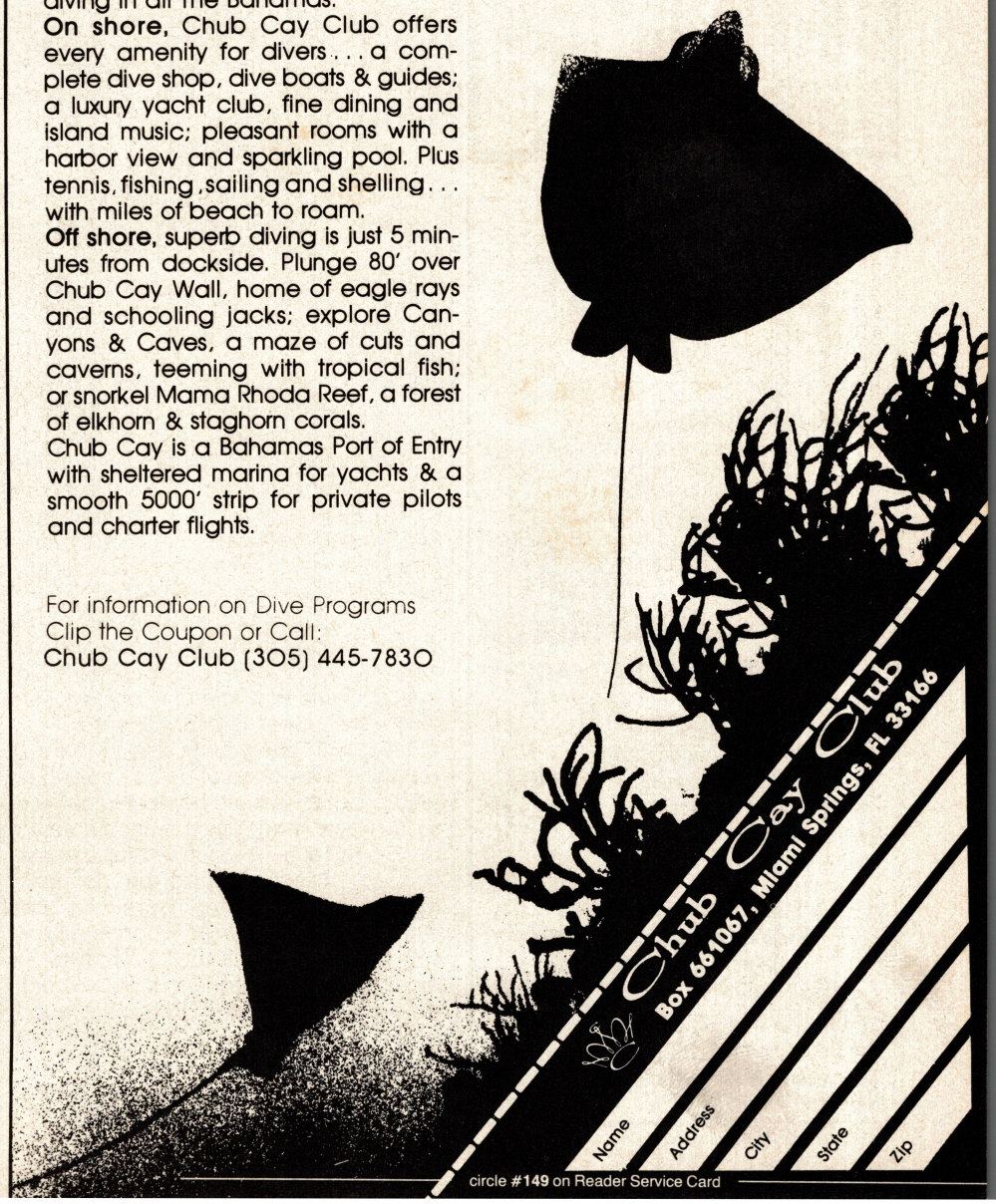

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TECHNIFACTS

Examples of some finds in Hawaii in recent years will illustrate their relative importance. A diver found a single, ancient, carved-stone canoe anchor imbedded in coral one-half mile from shore. This was of historical interest since it indicates ancient Hawaiians were at this site. Other divers found and recovered several very old carved stone anchors, carved stone canoe busters, adze heads and numerous sling stones; the kinds of things used by early Hawaiians during battle. These were found in fairly shallow water off Waikiki, an area believed to be one of the landing places of King Kamehameha when he conquered the people of Oahu. It seems likely some of these stone implements were from this war fleet and thus are historically important. As a final example, suppose a diver located the sunken remains of the royal yacht of a later Hawaiian monarch. This would be an archaeological treasure.

Divers can enhance the importance, interest and value of their occasional underwater finds by taking a few simple steps. First, when an object is found, do not disturb it. Instead, make a complete survey of the area. Determine its position by taking bearings on the surface. Study the surrounding area for other objects that may add to the meaning of the first object. Take measurements. Make a sketch, or sketches. Take photographs and make notes of all findings. Log the surface bearings for future need and mark the exact location of the object on the bottom by some means. Only then make a recovery of the object. As soon as possible, give the object an identification number or code number and log this with the notes compiled previously. In the future, when writing about, discussing, or selling the object, a complete, and therefore more valuable account, may be provided for each identified and serially numbered object.

Objects found underwater take on additional importance if you can find out when, why and how they reached their location. Some answers may be apparent when the object is studied carefully in context with everything else in the surrounding area. Also of use in making an analysis of this would be geological, meteorological and environmental conditions in the area. As much of this information as possible should be obtained, logged in underwater notes and later written up in the complete report placed with the find. Such a report or collection of information will enhance the historical (and monetary) value of the object found. As a matter of fact, without this data, objects have little value of any kind.

Divers and archaeologists are at odds about whether or not an object found by a

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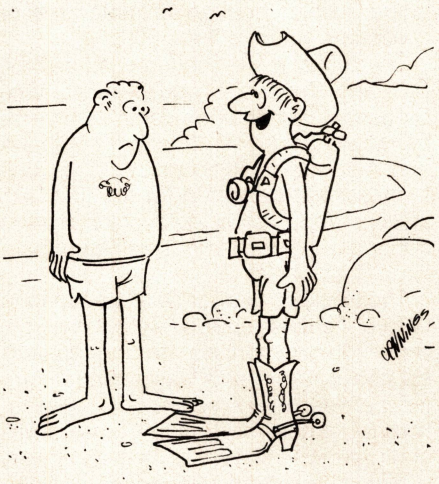
sport or professional diver should be disturbed. Divers who search for, recover, restore and sell valuable objects feel that if they do not recover these objects they may well be lost forever. This argument is probably justified in many cases since objects are sometimes uncovered by storm waves or for some other reason and, if not recovered almost immediately, will be buried again, perhaps forever. Also, the work of the archaeologist is slow, and there are so few of them that the objects could be lost forever owing to the time lag between diver finding and scientific study and recovery. Finally, some objects have been so strewn around by wave action or by the people who lost them that it makes little difference if a sling stone (for example) is found at spot A or at spot B, a dozen feet away, and an intelligent study and recovery by divers is better than total loss.

An evaluation of correspondence to Technifacts and of popular literature indicates that divers always have and probably always will continue to search for and recover every conceivable kind of object, whether recent or very old. This and the following Technifacts are intended to discourage divers from destroying archaeological sites. They are, instead, designed to encourage divers who are going to engage in the recovery of objects to do so in a manner that equals techniques used in salvage archaeology, so that the objects and related information, carefully compiled and documented, will be of value historically and to the professional archaeologist. Divers are urged to carefully and intelligently evaluate their finds and to seek professional help if there is any indication that a find is of historical significance.

Technifacts next month will discuss methods of restoring and preserving some of the many kinds of things found by divers in their search for underwater history.



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TREASURE

BY GEORGE W. HARTWELL

Al Brice's hand flagged the dense silt. Heavy, gray clouds mushroomed with each pass of his palm. Swirling eddies of rust-colored particles danced from the shallow cavity. His unhurried, persistent fanning excavated a pit, a yard in diameter, to a depth of nearly seven inches below the adjacent, smooth-rock rubble lake bed.

In a cobra-swift movement, Al's hand recoiled from the muck. His fingers tapped a quick cadence on my left arm before they drifted back to the center of the hole, rigidly pointing toward a marble-sized, leaden mound. In 10 feet of water beneath the surface of Lake Ontario, not far from where the first shot was fired in the War of 1812, Al Brice plucked a crude musket ball from algaed oblivion.

Who would argue it wasn't the first shot fired? Or the last? Or that it wasn't discarded by a departing quartermaster? Or blasted at a migrating Canada goose? Or that it didn't roll from the deck of a sinking Great Lakes warship when the United States and Great Britain fought for control of the island seas? "Whoever controlled the lakes," Brice explained, "controlled the West."

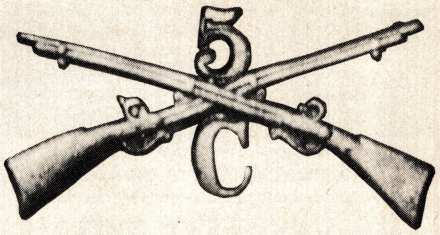
Sacket's Harbor, New York would yield more of her treasures this day, and keep at least one, in a diver's odyssey through hundreds of years of military history which shaped the destiny of America.

In more than 25 years of exploration, Brice, a YMCA Gold and PADI instructor/dive shop owner from Marcy, New York has recovered some 3000 to 4000 artifacts which bear an estimated real or collector's value of $100,000.

The artifacts are scattered across the U.S. and Canada in public and private collections and include items as diverse as whole cannons, anchors, Mohawk and Algonquin Indian relics, brass uniform buttons designed for the first U.S. artillery troop, solid gold coins minted during the California gold rush and Spanish pieces of eight.

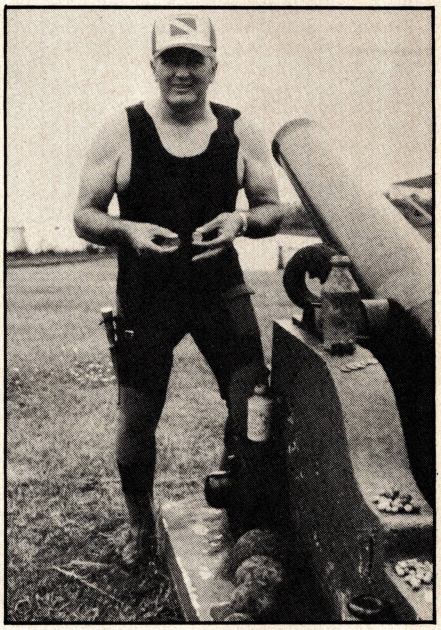
The Sacket's Harbor saga began long before settlers spilled westward from fledgling communities on the eastern seaboard. The region was a neutral territory between the homelands of Indian nations to the north and south. The area was abundant with fish and game and it was to the natural harbor the aboriginal Americans came during the summer months to find shelter when raging storms transformed Lake Ontario from placid tranquil-

OF SACKET'S HARBOR



photo/Al Brice

photo/George Hartwell



ity to a huge cauldron of wind-tossed, thundering waves.

Pioneer colonists established a beachhead at the harbor. They were followed by legions of battle-ready soldiers and sailors keenly aware of the strategic importance of Sacket's Harbor in defense of the St. Lawrence Seaway and the Great Lakes route to the West. The U.S. Navy maintained a presence at Sacket's Harbor until 1955.

Each resident force left behind evidence of its occupation and in the mid 1950's Al Brice found his first treasure.

"I was diving and I found a cannon ball. I assumed there must be more," Brice said. "We began working our way outward from shore. We found coins, jewelry, Indian relics, everything."

Most of what Brice and his dive partner, Bill Davenport, have found over the years rested in water ranging in depth from a few inches to 150 feet. The area is not plagued by strong currents, but frigid temperatures and poor visibility afford the explorers adequate environmental challenge.

Of all the paraphernalia Brice has recovered, he regards the ornate, brass belt buckles and uniform hat plates as the most valuable. "They're military art," he explains. Each was meticulously crafted by hand. Each has a collector's value of several hundred dollars. Distinctive uniform buttons identifying the brigade or garrison to which its owner was assigned are coveted.

Brice keeps careful records of the location of each find for historical and archaeological accuracy. "Most of the items were discarded," he says. Each period of settlement and occupation seemed to have its own dumping ground. "We know there's an area where everything we find will date from the War of 1812. A little farther it's the Boxer Rebellion, then the Civil War, right on up to

(Continued on Page 95)

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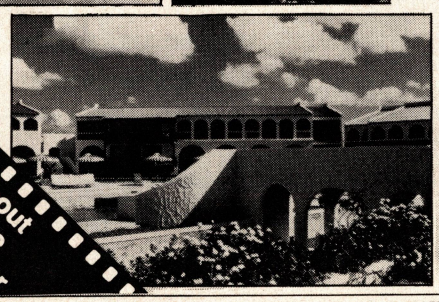

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A fully functional marine biology lab has been constructed at the Habitat on Bonaire. The building of the lab was a combined effort that included the government of Bonaire and it will be supervised by Roberto Hensen of the Caribbean Marine Biological Institute (CARMABI) in Curacao.

In addition to general marine biological research, Hensen is conducting a four year study on the growth and development of conch. Hensen's work will be conducted in conjunction with Habitat's dive operation and personnel.

Visiting biologists who wish to conduct research or a marine biology course in Bonaire may receive supportive assistance from the facility.

For more information, contact Habitat's representative office: P.O. Box 237, Waitsfield, VT 05673; (802) 496-5067.

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Captain Dee is back on the *Shark Killer III* after running the *Impossible Dream* for ten months in the Bahamas. Capt. Dee

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DIVE TRAVEL PROFIT GUIDE

OceanQuest Tours & Travel, Upper Montclair, NJ, has published *A Guide to Dive Travel Profit*. It will be introduced to the dive industry at DEMA Show, January 23-26 in San Antonio, TX.

OceanQuest will distribute the guide free. According to Frank T. Shane, president, "This guide covers everything a dive shop or group leader should know

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PENNEKAMP XMAS REUNION

Al Marques, director of the Underwater Activities Program at Pennekamp in Key Largo, FL, is planning some very special activities for the Christmas holidays. There will be a reunion of all former Pennekamp students and divers, celebrated with a banquet on Saturday, December 19.

The other activities are: Scuba Life Saving (SLAM), Saturday and Sunday, December 12-13; Advanced Certification, Monday through Friday, December 14-17; Reef Ecology, Friday through Sunday, December 18-20; and a visit to the NOAA/FU/WC recompression chamber in Miami Friday, December 18.

For registration and further information, call or write Al, Coral Reef Park Company, John Pennekamp Coral Reef State Park, P.O. Box 13-M, Key Largo, FL 33037. Telephones are: (305) 451-1621; Miami line, 248-4300; Florida toll free line, (800) 432-2871.

PRATT TO TREASURE CAY

Joel Pratt is the new manager of Treasure Cay Diving Centre, Abaco Island, Bahamas, operated by the Underwater Explorers Society (UNEXSO).

Pratt, a native of Long Island in the Bahamas, has been teaching diving for seven years. He joined UNEXSO in Freeport in 1979. Prior to that time, he taught in Nassau and at the Stella Maris resort on Long Island.

Treasure Cay also has a new, custom built 30 foot dive boat, *Easy Diver*. Powered by a 225 horsepower diesel engine, it can take 24 divers to dive sites in less than 20 minutes.

LOCKHEED AWARD

The Marine Technology Society recently awarded the 13th annual Lockheed Award for Ocean Science and Engineering to Andre Galerne. Lockheed Corporation sponsors the award each year in the interest of furthering ocean science and technology.

In 1970, Galerne formed IUC International, Inc. to serve the offshore oil industry. IUC is the parent company of Professional Diving School of NY.

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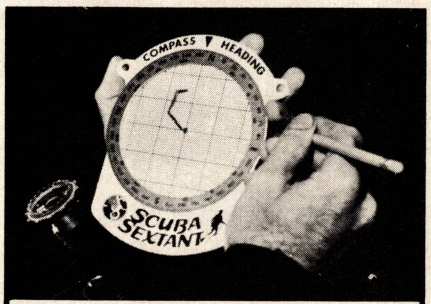

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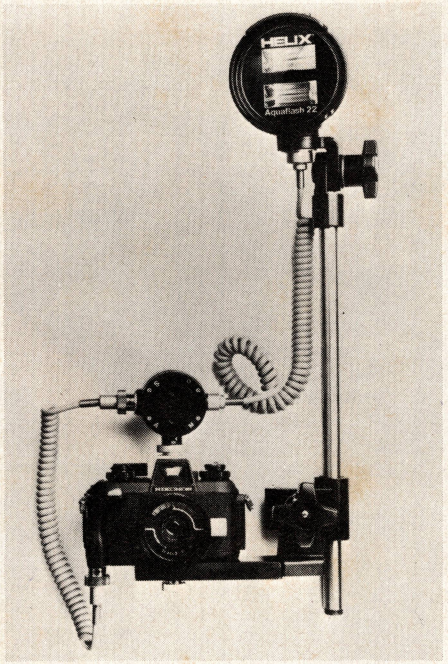

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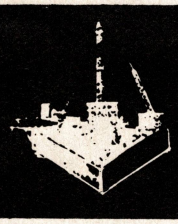

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Attended by the wedding party and the usual residents of the Stadium — five dolphins and a pilot whale — the couple was observed by family and friends through windows in the giant aquarium.

photo/Karl Wallin

Randy and Nancy Swift exchange rings U/W.

A special underwater microphone system was used so that the wedding vows could be heard by all. The couple wore full facemasks which enabled them to speak underwater.

UNDERWATER CANADA '82

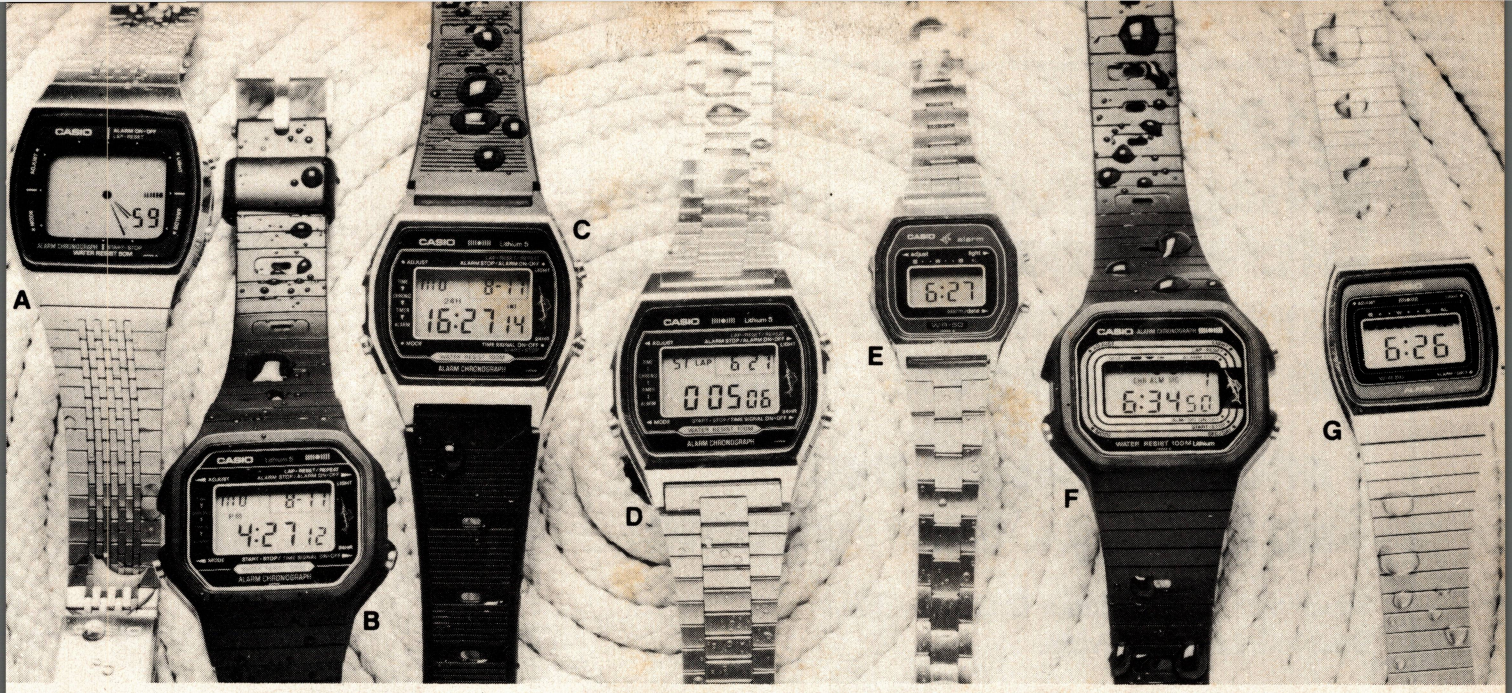
The Ontario Underwater Council has combined resources with the Defence and Civil Institute of Environmental Medicine to provide the commercial and scientific community in Canada with a forum for the exchange of ideas on ocean technology. Entitled the Canadian Ocean Technology Congress, the forum will be held as part of the annual Underwater Canada conference.

This year Underwater Canada '82 will be held in the new convention facilities of the Constellation Hotel in Toronto, March 11-14.

The Canadian Ocean Technology Congress will take place on March 11-12 and will feature high technology exhibits, deep diving equipment and Canada's leading diving scientists.

The remainder of the program, the Sport Divers Weekend (March 12-14) will include 18 speakers, over 100 dive travel and equipment exhibits and a grand finale with Dr. Joe MacInnis guiding those present through a panoramic overview of Canadian diving.

For information contact: Underwater Canada '82, 160 Vanderhoof Ave., Toronto, Ontario; (416) 424-6911.



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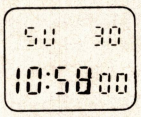

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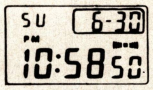

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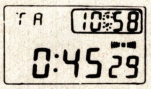
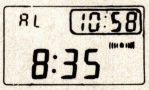


COUNTDOWN TIMER



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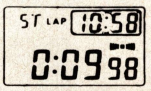

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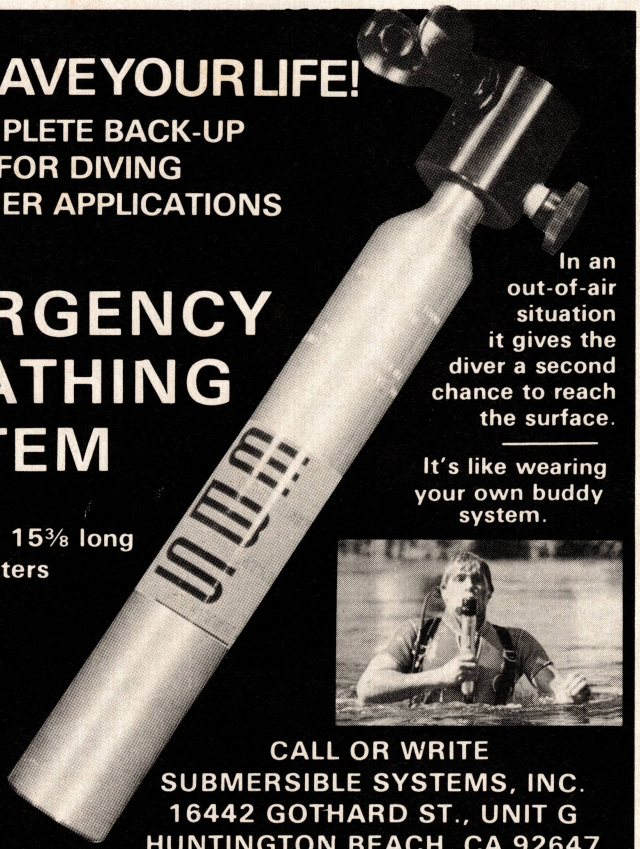

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Rx FOR DIVERS

BY CHARLES V. BROWN, M.D.

DIABETES AND DIVING

Can diabetics dive? This question keeps cropping up, which is hardly surprising, since one person in 80 has the disease. Those denied medical clearance often feel persecuted, and we take a lot of flak about it. Others write in to say they've been diving safely for years and don't see what the fuss is all about. One of the latter is John Stoneman, director and underwater cinematographer for Mako Films, and we quote from his letter:

". . . your reservations regarding insulin dependent diabetics are for those who don't understand the illness or are just downright irresponsible. I've been a professional diver for over 20 years, am dependent on insulin, hold a 4 star CMAS rating, and have thousands of dives behind me in all conditions and in all oceans, and have never had a diabetes or insulin related problem whilst working . . .

"Have regular checkups, reduce insulin according to the effort required, carry high sugar foods on the boat, and regulate your diving to avoid peak insu-

lin levels. Test your blood sugar frequently, and make sure your buddy or support diver knows about your illness and can recognize the symptoms of insulin reaction.

". . . I'm sure a lot of people are going to be very surprised to hear of my affliction, but I think it's time to get into the 20th century and stop regarding diabetics like they're possessed of demons."

Stoneman has an excellent point and he makes it very well. Still there are facts we can't erase. Insulin reactions do occur. And there is the weight of expert opinion we can't ignore. All the current textbooks are negative. *Diving Medicine* states that brittle diabetics and those subject to insulin shock shouldn't dive. *Underwater Medicine* assumes that diabetics would not continue aquatic activities. *Diving & Subaquatic Medicine* specifies that drug dependent diabetics shouldn't dive. Technical texts agree. *The Complete Underwater Diving Manual*, compiled by NOAA and the Office of Marine Resources, lists endocrine disturbances (which diabetes is) as disqualifying. So do the British Society for Underwater Technology, the CIRIA Underwater Engineering Group, and many others.

The contradiction arises because diabetes is not a simple disease, and not all diabetics are alike. Most cases start in middle age and are manageable by diet alone or by diet and pills. The few in this group who dive have been doing so for years and aren't likely to encounter any surprises. Furthermore, these people aren't subject to rapid, wide swings in their blood sugar levels.

Insulin dependent diabetics, by contrast, usually acquire their disease earlier in life — about the time they want to dive. They're more subject to insulin reactions for at least four reasons: (1) These are young people and many don't understand their disease and/or are downright irresponsible; (2) Many go through a phase when they resent their disease and ignore it — a psychological denial that can be fatal; (3) In some the diabetes is very brittle, meaning that the insulin requirement can vary so much and so unpredictably that there's little time to recognize and correct a reaction. We've known teenage diabetics to die of insulin shock with candy in their pockets; (4) Hard exertion greatly reduces the insulin requirement. Any educated diabetic will adjust his insulin dose to the expected effort of a dive, but should an unexpected need for prolonged maximal exertion arise (e.g. to save one's self or buddy) the insulin already taken can become an overdose and do one in.

Finally, any diabetic may, with age, face an increased risk. Beyond age 40, more than half of all scuba fatalities are probably due to heart attacks, and diabetes is a known predisposing factor.

Other factors also bear on the approval of a diabetic for diving. There's the

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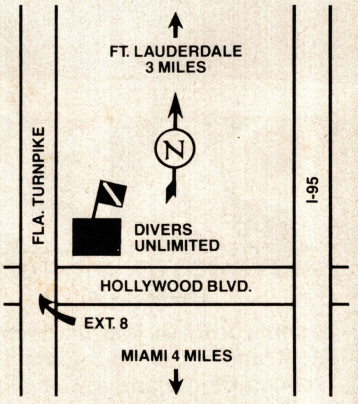

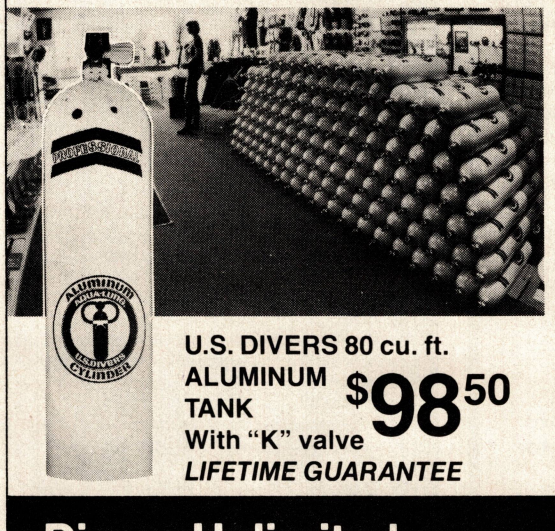

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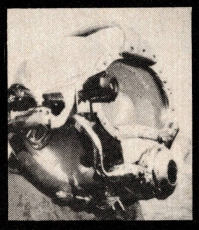

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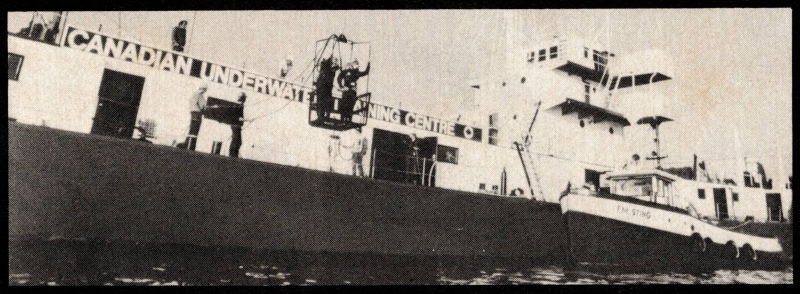

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chance of harsh operational requirements and distance from skilled aid in military and commercial situations. There's the uncertainty of an applicant's wishful thinking vs. an experienced diver's track record. And there's the legal liability assumed by the doctor and instructor who okays a diabetic (You mightn't hold him responsible for an accident, but will your heirs?).

In summary, we certainly would not tell a master like John Stoneman to stop diving, but we would advise an aspiring neophyte with diabetes to consider the hazards before committing himself/herself.

QUESTIONS

Question: The sea is a fickle mistress who occasionally, unpredictably turns on her lover. Grand as the Caymans usually are, during one nasty week diver J. O'Flaherty, along with hundreds of other visitors and locals, was stricken with "sea itch." He describes it as an intensely itchy, spotty red rash affecting skin covered by bathing suits and lasting two to seven days. He wants to know the cause, the prevention, and failing prevention, the treatment.

Answer: Many mini-creatures can irritate bare skin, yet some perversely favor covered areas. Apparently the bathing suit reduces the chance of their being washed away before they've had time to penetrate. Such episodes don't occur often, but when they do, the offending organisms are present in abundance, so if there are many bathers, there'll be many victims.

The culprit is usually not identified, but there are two leading contenders. One is a blue-green algae that occurs down to 100 feet. A number of cases of seaweed dermatitis caused by this organism have been reported in Hawaii. More common around the world is schistosome cercarial dermatitis, variously known as clam digger's itch, swimmer's itch, sea bather's eruption, etc. It's caused by a larval form of schistosome worm that parasitizes various birds and mammals. Other suspects include coelenterates (jellyfish, etc.), calycophora, dinoflagellates and pteropods.

Prevention is simple — dive nude. Though simple, this is not necessarily best. Aside from the stuffy attitude of the gendarmerie, the things that cause the rash can attack bare skin, too. A more practical method is to wash with soap after diving, or at least dry yourself to remove water droplets that could harbor cercariae busily boring inward. And wash your bathing suit, too.

Treatment is usually not essential, as the malady is self-limited. However, corticosteroid hormones applied to the skin or

taken as pills may ease the misery. Antihistamines and ordinary aspirin are also useful.

Question: Among the miseries meted out to man is hypersensitivity to noxious agents. Anyone will suffer in the embrace of a Man O' War, but C. R. Featherton of Houston hurts on contact with its most benign relatives. If he touches bottom while photographing, or sits on a submerged platform, the area of contact with encrusting organisms gets red and sore. Tiny planktonic jellyfish have the same effect. He's fresh from Cozumel, and the itchy spots on his legs threaten to drive him crazy. He's tried everything, to little avail.

Answer: Maybe your hide is a less effective barrier than most to the little devils' pitchforks. More likely, you're hypersensitive to their toxins. Your immune system overreacts and releases too much histamine and other misery inducing material.

There are no new medical breakthroughs for your protection, but there is an old tried and true method. Dr. Bruce Halstead, who authored the definitive text on venomous marine life, won't enter the water without his skintight body suit of close-woven nylon.

Question: Rodney McKnight of Rockingham, NC finds that diving sometimes leaves him with dry lungs, or so it feels. This was especially noticeable toward the end of a recent three day diving trip, and led to a persistent dry cough. He tried normal saline aerosol treatments and an expectorant syrup to loosen and raise mucus, but didn't recover till an antibiotic was added. Any ideas for next time?

Answer: Twenty thousand breaths daily deposit a lot of trash in the tracheobronchial tree. Removing it is a process called bronchial toilet. The unwanted particulate matter and microorganisms are trapped on a sheet of sticky mucus which is carried to the throat by beating cilia, and swallowed or spit out. The mucus has to be moist, or it's too stiff for the cilia to move. Dry air robs moisture.

Scuba air is very dry and it bypasses the nasal membranes that normally moisturize inhaled air. And now we come to individual differences. Some divers make moister mucus than others, and some suck up tank air less rapidly than others. These presumably tolerate more diving with less dry lung distress.

What can you do? Install a moisturizer between your first and second stages, if you can find one. Farallon/Oceanic used to make them but doesn't any longer. Forget cough syrup. Water is the best expectorant, so drink plenty before and after diving. Keep the mucus moving, and bacteria won't tarry in your lungs long enough to set up housekeeping.

Question: "My son Ted has a weak nose. Weak noses run in our family. Often on a hot day his will bleed. Once it bled during a dive." So relates Ted Tsavlis, Sr.

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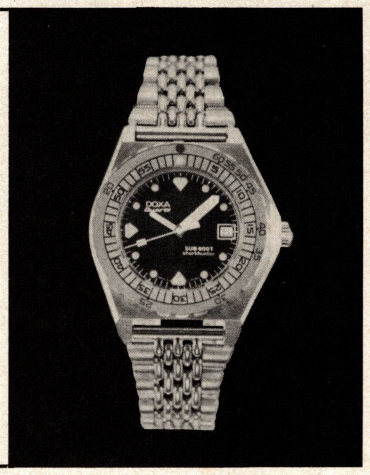

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On the reverse side is a reusable dive planning and recording worksheet. With an ordinary pencil, you can plan and record your dives. It erases clean after use.

A list of commonly used Dive Planning terminology (a complete refresher course in how to use dive tables) is also listed on the reverse side along with easy to follow rules which eliminates the need to know confusing "exceptions" to the tables.

NAUI Dive Tables are available from NAUI Headquarters, P.O. Box 14650, Montclair, California 91763, Phone: (714) 621-5801.

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RX FOR DIVERS

of Thousand Oaks, Calif. He'd like to know how diving starts nosebleeds.

Answer: Dive related nosebleed isn't common, but there are several potential causes. Bleeding that arises from the nose itself usually comes from the front part of the septum — the partition between nostrils, where fragile vessels are protected only by a thin membrane. Severe mask squeeze could overdistend and rupture them, though we haven't heard of it. A mighty sneeze occasioned by water up the nose is a likelier possibility. Purposely distorting one's features or pinching one's nose in aid of ear clearing might crack a hardened mucus plaque and slice its sharp edge through a vessel.

In most cases, blood that exits the nose probably comes from a sinus that's been squeezed. During descent, ruptured capillaries bleed into it, then during ascent expanding air pushes the blood up into the nose. The surprised diver sees it in his mask after he surfaces. No big thing.

Question: Modest in Modesto is a scuba student concerned about whether diving with an IUD (intra-uterine device for contraception) can be bad, but she isn't about to ask her male instructor.

Answer: IUD's are less effective than originally thought and occasionally cause infection, bleeding or abortion. However, there's no reason to expect any interaction between diving and the IUD.

Question: Some months ago Mike Anderson of Thousand Oaks, California suffered a concussion. He doesn't say how, but it was enough to keep him in the hospital for a week. Now he's in scuba training and since his last pool session gets frequent headaches. Any connection?

Answer: It's possible. We can't say much without knowing all the details. If you have a brain contusion or a small clot pressing on your brain, you may be at increased risk of seizures or even decompression sickness. Confide in the neurosurgeon and stay out of the water until he can assure you it's safe.

Question: Michael Dale Kelly of Texarkana, Arkansas wants advice on diving after surgery. The doctor who did his appendectomy couldn't supply any.

Answer: Whether and when it's OK to resume diving after surgery depends on the underlying disease, the operation, the state of healing and any complications. Each case must be considered individually. After an uncomplicated appendectomy, a healthy young man should be ready to dive when he's ready to swim or run, which is to say when the wound heals. Three weeks should suffice, and if a small muscle splitting incision is used, possibly a lot less.

BROWN MEMORIAL

Those who were privileged to know Dr. Charlie Brown will always treasure his memory. In order to keep his memory alive for future generations and ensure that his contributions be recognized, a non-profit foundation is being considered. It would disburse funds in his name in an effort to ensure that his work continue. If this is to be a successful venture it will take a commitment from his friends in the form of monetary contributions. Setting up a non-profit foundation involves a considerable amount of legal work both with the State of California and the IRS. One NAUI member has volunteered his legal expertise for this project. Other members have also volunteered their time for initial administrative duties. What is needed now from the diving community is feedback as to the extent that it would be willing to support a foundation of this sort. Contributions could either be in the form of currency or through the organization of fund raising functions. Money is not being solicited at this time. If you are interested, please write to: Charles V. Brown Memorial Diving Foundation, 4195 Old San Jose Road, Santa Cruz, CA 95065.

SACKET'S HARBOR

(Continued from Page 85)

World War I."

Brice selected a spot for our dive that would plunge us into the heat of battle of the War of 1812. Minutes after his musket ball discovery he stuffed a blackened uniform button into his collection bag. I strayed from the site and began fanning debris away from a submerged cliff ridge. The silt gave way easily to hard rock upon which rested numerous shards of broken pottery, square nails, an antique shell casing and a roughly 3 by 4 inch, thin, brass rectangle. Each item was neatly arranged on a rock.

Al swam over, excitedly, and gestured for me to follow him. He'd unearthed a productive pit. My numbed fingers awkwardly sorted a few of what appeared to be collectible relics, including a rusty iron ring, another shell casing and a brass cannon primer. Al's dig had given up, among other things, a golf ball-sized grape shot which would have gone unnoticed by all but a trained observer.

"Jeez," I exclaimed as we drove toward home. "Left something in the water I wanted to show you."

"What'd it look like?" Al inquired.

"Some sort of brass plate, had a couple of knobs on the back."

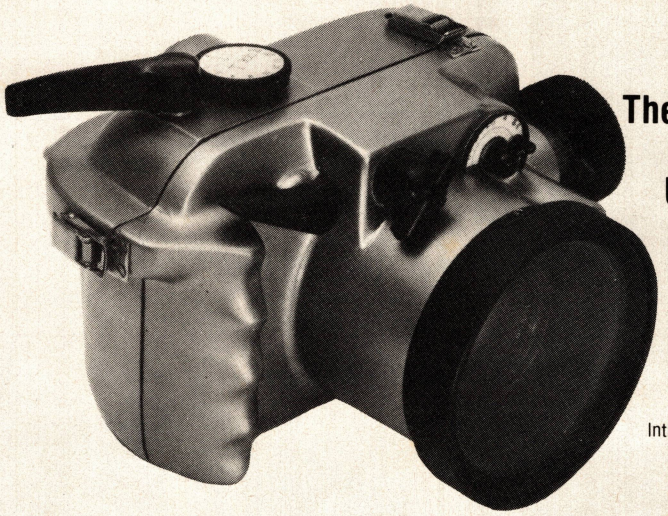
"Was it sort'a curved?"

"Yeah."

"George," he admonished, "you left behind about $300 worth of belt buckle or breast plate."

It's still there. You'll find it on a flat rock in three feet of water atop a small pile of broken pottery.

NEW BREED



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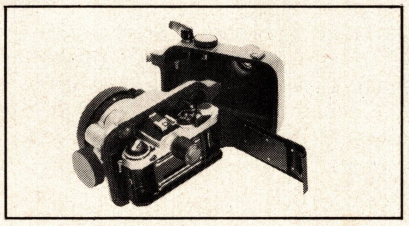

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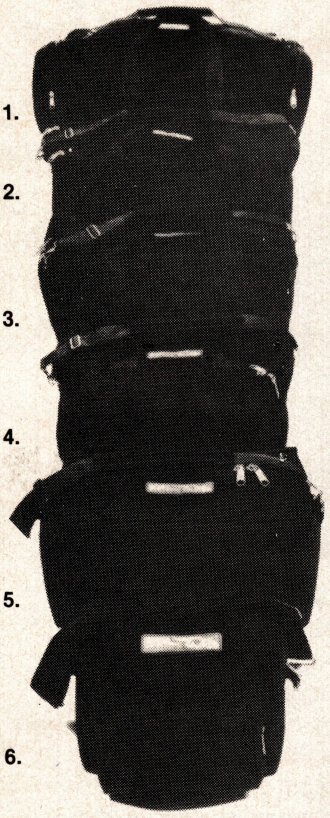

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7. **Regulator Bag—12L x 6H x 5W. (Not Pictured).....$9.00**
8. **Mask Bag—8L x 5H x 3W. (Not Pictured).....$7.00**
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U/W SOCIETY PHOTO CONTEST

Entries for the Underwater Society of America's 1982 Photography Competition will be accepted from now through February 25. The contest is open only to members of the Society but a membership application (dues are $10) is available upon entry.

Entry categories for the contest include both saltwater and freshwater prints,

slides and movies. A special 110 print category will be included.

First through third place winners in each category will receive an Award Plaque. Their photographs will be exhibited at Our World—Underwater in Chicago, IL on April 30-May 2.

First place winners will receive equipment as prizes and have their photos featured in Canada's Diver Magazine and the Underwater Journal.

Contest judges include Paul Tzimoulis, editor/publisher of SKIN DIVER, Gale Livers of Ikelite and Rick Frehsee, freelance U/W photographer/journalist.

For information and entry forms, write: Paula M. Novotny, 9702 E. 12th St., Indianapolis, Indiana 46229.

JONGBLOED BOAT

(Continued from Page 60)

I finished the dive ahead of Bill, who was wearing double tanks. This gave me an opportunity to test the boat's stability by entering alone. It passed with flying colors. Pulling yourself up from the water with this boat is easier than it is with an inflatable, because you don't have to climb over the pontoon. The craft remained perfectly steady while I came over the side, then leaned over and pulled in my tank and BC. Any boat less than five feet wide would list precariously with more than 250 pounds of diver and equipment over one side, but this one remained on an even keel. I was impressed.

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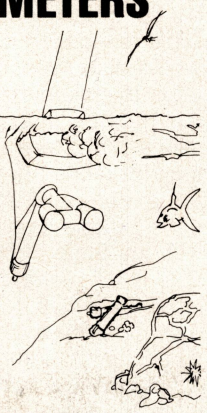

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boat, the trade-off is less comfort and the need for caution in rough sea conditions. If used sensibly, its rugged quality construction should hold up for many years.

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MUCHANSKI TO NAUI

Eugene Muchanski has been appointed director of marketing services of NAUI. According to executive director, Marshall McNott, Muchanski will assist independent instructors, dive stores and other NAUI programs in their marketing needs.

With 14 years experience as a certified diver, eight of them as a NAUI instructor, and two years as a course director, combined with his education and business experience, Muchanski said that he has been, "training for exactly this type of position for many years."

McNott, said, "We have employed Eugene Muchanski because of the background he outlined, especially his marketing expertise. He will strengthen our dive store program . . . He will also show independent instructors how to better market their programs. . . ."

Answers: Magazine Minutiae

1.) **Jim Auxier & Chuck Blakeslee**
2.) **Driftwood**
3.) **Water World & Le Trident**
4.) **Folco Quincili, Blue Continent**
5.) **Healthways U/W Safety Manual, E. R. Cross**
6.) **Scuba Totes**
7.) **Bel Aqua**
8.) **Snork-Aire**
9.) **Sparling School of Deep Diving (Jack London Square)**
10.) **Healthways Scuba Regulator**
11.) **Northill Air-Lung**

HUB 1982 PROGRAMS

Human Underwater Biology, Inc. will offer nine Diving Medicine In Depth programs for physicians in 1982. Course locations will include Bonaire, San Salvador Island, Cayman and Haiti.

The first program will be hosted by the Flamingo Beach Hotel on Bonaire, Netherlands Antilles, January 9-17.

In addition, Paul Tzimoulis, editor of SKIN DIVER and Geri Murphy, an U/W photo-journalist, will be guest speakers.

For further information about the January program and/or for a listing of 1982 course dates, contact: Human Underwater Biology, Dept. 1558, P.O. Box 5893, San Antonio, TX 78201; (512) 492-9395.

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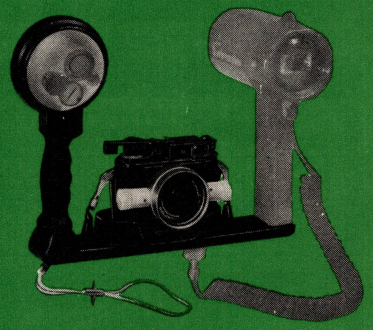

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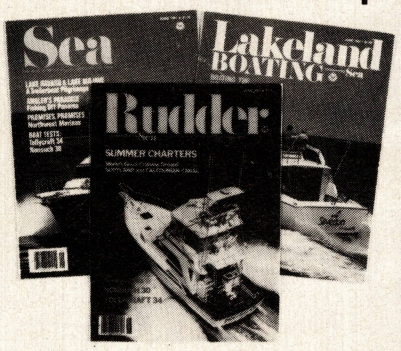

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THE WAY WE WERE

(Continued from Page 22)

Hunt television series, with Lloyd Bridges, was one of the most popular on the air. I met Bridges through our sons who were in the same Boy Scout troop and I co-authored the book *Mask and Flippers* that a publisher wanted him to write. I then took a course in television writing at UCLA and wrote scripts for his show, Sea Hunt, until the series was canceled in 1960.

Thus, the decade of the 1950's was a period of skin diving's rapid expansion and progress. But during the 1960's the doldrums set in and the industry went into a major depression. I retired from the Los Angeles Fire Department in 1962 and went to work as advertising and sales promotion manager for U.S. Divers. After a few months in my new job I learned that business was so bad the dive shops were folding all over the country, and some of the major dive equipment manufacturers, including U.S. Divers, were on the verge of bankruptcy.

A basic cause of the business slump was the phenomenal dropout rate: More than 90 percent of newly trained divers were leaving the sport. I made a telephone check and learned that the major reason for this was that the novice divers didn't know where to go and had no one with experience to show them. Dive travel and tourism with resorts, facilities and guided tours were nonexistent and the novice was left to fend for himself.

I tried to sell U.S. Diver's management team on a program called Aqua-Lung Tours and argued that skin diving should follow the example of snow skiing by promoting tours to warm water resort areas. But my idea was rejected and, in 1963 when SKIN DIVER was purchased by Petersen Publishing Company, I joined the magazine as marketing manager. My convictions regarding the dive tourism market came with me.

Jim Auxier, then SKIN DIVER's Editor/Publisher, also resisted my idea of promoting dive tourism as an impractical dream. But Dewey Bergman, an experienced diver and travel agent, agreed with me wholeheartedly, and he founded See & Sea Travel, specializing in dive tours.

Our first target was Cozumel, a sleepy Yucatan fishing village. Bergman signed a contract with one of the small hotels that agreed to install the dive equipment and facilities he requested. The feature article I wrote on Cozumel diving generated so much interest that within a few months every diver I talked to had either been to Cozumel or was planning to go. As a result, SKIN DIVER received advertising contracts from Mexicana Airlines, See & Sea Travel, and several Cozumel hotels. The sleepy Mexican fishing vil-

lage enjoyed an unprecedented boom and the small hotel quickly expanded into a modern, multi-story resort.

Similar tactics were used to promote dive tourism to other areas such as Tahiti, the Florida Keys and Caribbean. National Airlines joined the crusade by advertising a Flying Skin Diver Club.

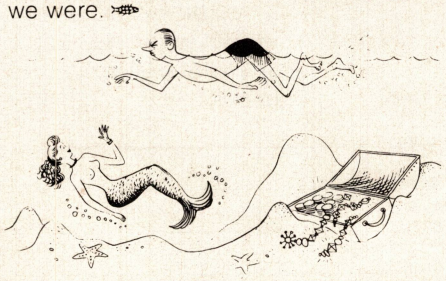
In 1964 a young diver named Paul Tzimoulis became SKIN DIVER's Eastern Advertising Manager. His articles and photographs on diving in such places as Israel, South America and the Caribbean helped give skin dive tourism a major boost. By the time Jim Auxier retired and Tzimoulis became publisher in 1966, dive shops and instructors had learned that tourism paid off and, as a result, today's novice can travel to dive resorts all over the world and enjoy facilities that rival skiing resorts in both luxury and service.

In 1968 I realized a lifelong ambition by quitting my SKIN DIVER job and trying my hand as a full time, freelance writer. I sold my house, moved into a travel trailer, and set out on a swing around the country. This lasted two years, until I hit Florida in 1970 and learned that the gorgeous coral reefs of the Keys were threatened by pollution.

With Paul Tzimoulis' encouragement, I began a series of hard-hitting feature articles exposing Florida's pollution and conservation problems. Many of these were firsts and widely reprinted or quoted in newspapers and other media. The resultant publicity sometimes led to corrective action or legislation. For example, the series exposing the threat to Florida's coral reefs led to the first scientific studies ever made of these ecosystems and the eventual designation of the Florida Keys as an, "Area of Critical State Concern."

My SKIN DIVER articles were also instrumental in helping to stop the infamous Cross Florida Barge Canal, outlawing development of productive marine areas by constructing private waterfront canals, and preventing an attempted state takeover of dive tours in Pennekamp Park.

My underwater experiences covered an exciting and interesting period of American history. My only regret is that newcomers to skin diving will never see the magnificent beauty and bounty of the underwater world as I saw it 40 years ago because that world no longer exists. It has been destroyed by pollution, and modern divers have no idea of the way we were.



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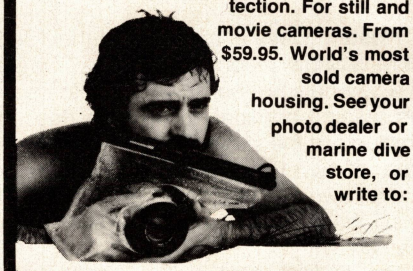

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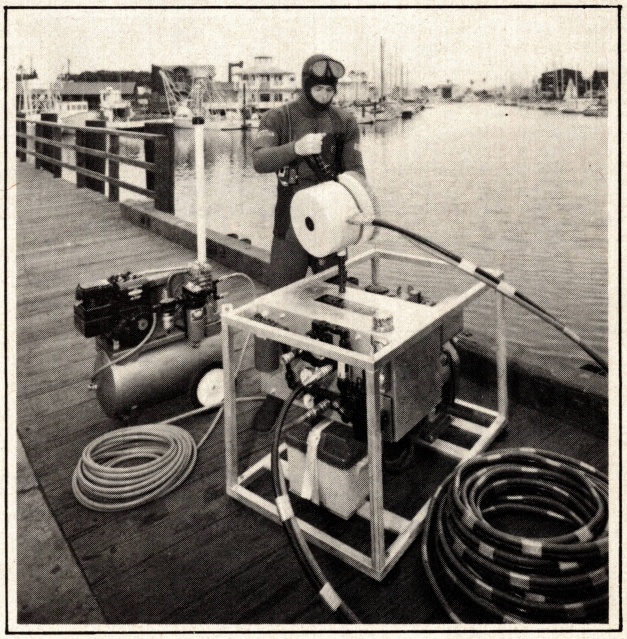

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Western Days is the spirit of the 1982 DEMA Show and "good guys" white cowboy hats will be given away to dealers placing nominal orders with Pelican Products at the show. The authentic Panama straw, hand blocked hats have leather sweat bands and are topped with head band crests made of pheasant feathers.

The DEMA Show will be held next month in San Antonio, TX. Dealers are urged to stop by the Pelican Booth early to pick up their hat and be in style for the Show.

Shown tipping DEMA cowboy hats to

their dealers are (right to left) Pelicans: Jerry Linehan, vice-president, Jan Lopez, manager customer service and Dave Parker, president.

For further information contact: Pelican Products, 23763 Madison Street, Torrance, California 90505; or telephone (213) 373-7358.

U/W HOCKEY NATIONALS

The 1982 Underwater Society of America-sponsored Underwater Hockey National tournament will take place May 22 and 23, at the Olympic pool at Circle Campus in Chicago, Illinois. There will be a men's and women's competition.

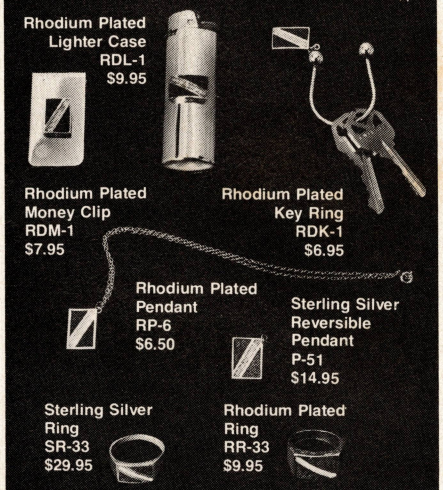
For more information on this tournament or the rules of play, history, strategy descriptions, etc., of U/W Hockey contact: Tom Miller, director, National U/W Hockey Committee, 1105 Helen, Deer Park, Texas 77536 — or write to: Paul Ulbrich, 5132 Dorchester, Chicago, IL 60615.

COM DIVING EDUCATORS MEET

Charlie Vallance, department head of underwater technology at Florida Institute of Technology, recently attended a meeting of the Association of Commercial Diving Educators (ACDE) held on Grand Cayman Island. The meeting covered such topics as training standards and certification for commercial divers, commercial diver physicals and diver emergency medical technicians.

In February, Vallance, secretary/treasurer for ACDE, will present a paper in New Orleans to the International Diving

Dive Flag Collection



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Symposium (IDS) sponsored by the Association of Diving Contractors. Entitled, Commercial Diver Training at the University Level, the paper addressed the two year university commercial training programs available at only three colleges in the country.

MAL DE MER MEDICINE

An anti-motion sickness medication has been developed which uses the skin as the portal of drug entry rather than the usual method of oral application. Transderm-V, marketed by CIBA Pharmaceutical Company, delivers a dosage of

scopolamine. A proven anti-motion sickness agent, scopolamine is delivered through the skin, allowing the medication to enter the bloodstream at a rate which optimizes the desired effects. A small patch, placed on the hairless skin behind the ear, is all that's required for up to three days of protection.

Now cleared by the FDA for prescription use, Transderm-V has proven effective in sea trials by preventing nausea and vomiting in 75 percent of subjects susceptible to motion sickness. The new system of skin delivery also reduces many of the side effects, such as drowsiness, common to higher doses of orally-ingested anti-motion sickness medication.

SUBSEA BROCHURE

Subsea Products, Inc., in cooperation with Alumacraft Boat Company of Arkansas, Mercury Outboards, and Rolls Axle Boat Trailers, is preparing a brochure dealing with freshwater underwater photography.

"It is our intention to show underwater photographers that they can take advantage of their own back yard, so to speak, in order to enjoy their photographic endeavors," says Larry Salvo, director of sales and marketing for Subsea. "Most people," Salvo continues, "are convinced they must travel to the coastline or to some exotic location in order to enjoy underwater photography — and this is just not true."

Subsea Products will release its brochure at the DEMA convention in January.

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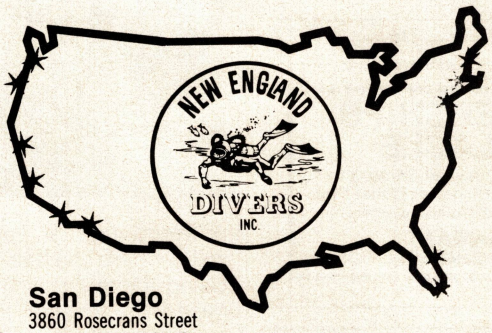

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WENOKA COMMEMORATIVE KNIFE

The Westchester Dive Center of Port Chester, New York, was one of the first dive stores in the world to receive the Wenoka Commemorative Knives. The

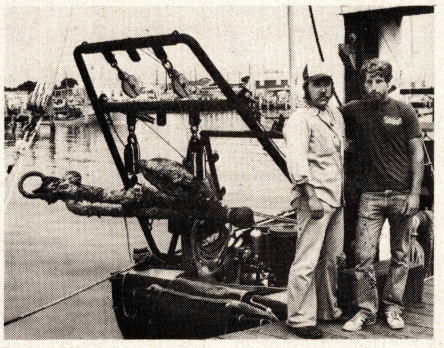
shop owner, Bob Tseng, is shown presenting Bob Jensen of Greenwich, Connecticut his limited edition knife. Jensen, who received knife number 0023 out of a production run of 2400, attained his PADI master diver rating through the Westchester Dive Center.

For course registration information call (914) 937-2685.

ANCHOR RECOVERY

After 78 years on the ocean floor five miles southeast of Point Judith, Rhode Island an 1100 pound anchor was brought to the surface recently by members of a research diving class from Dowling University, Oakdale, NY.

Capt. Gary Dow said the students, acting on reports of commercial fishermen, had located the wreckage of the steam-



powered tugboat, *Leyden* in 105 feet of water where she had gone down in 1903. Using a one ton airlift bag, the students raised the anchor to the surface and hoisted it onto the stern of the *Dolphin*.

The diving team reported that the huge boiler and most of the sunken vessel was still intact but covered with netting snagged from unfortunate fishing vessels over the years. More research is to be conducted on the history of the vessel and its anchor.

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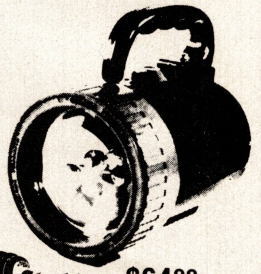

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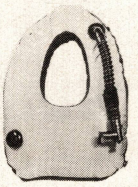

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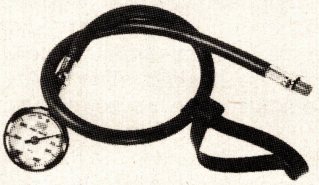

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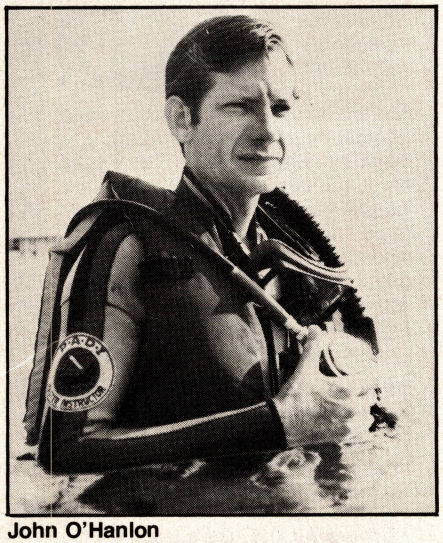
In a recent awards dinner held at the La Chateau Restaurant in St. Louis, Dennis Graver, PADI training director, awarded three St. Louis divers Master Scuba Diver plaques. Less than 365 divers world wide have achieved this rating.



John O'Hanlon

For further details write: John O'Hanlon, c/o The Dive Shop, Inc., 9832 Manchester Road, St. Louis, Missouri 63119; (314) 968-8099.

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Steamboat Diving and Salvage has successfully raised the 20 ton pleasure craft, *Blue Chipper*, from the San Joaquin River using an assortment of J.W. Automarine T10C and M10 lift bags.

The *Blue Chipper* was raised by attaching one lift bag to her engine mount, two lift bags aft and forward, and two additional lift bags to raise the main deck above water.

After the craft was successfully raised, rough conditions prevented dewatering at the salvage site, so the *Blue Chipper* was towed, with the lift bags providing

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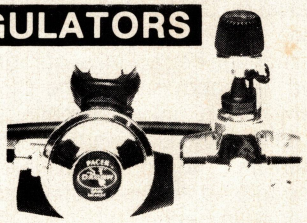

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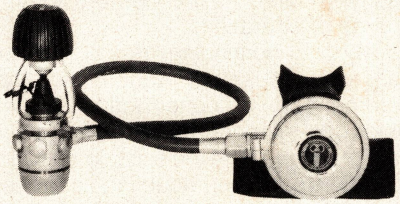

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IMPERIAL PURCHASE

Imperial Manufacturing was recently purchased from the Clorox Company of Oakland, CA by Aquanautics Corporation.

Imperial began in a garage in 1959 and was acquired by the Clorox Company in 1972. Imperial continued to build its sales volume and in 1981 attracted the attention of a group of private investors who formed Aquanautics Corporation to acquire Imperial.

Reginald Kempster, Imperial's new president, made several changes in Imperial's existing management. Nik Salmela is now the executive vice-president and general manager and Steve Taylor is now the national sales manager of the scuba products division. Don Sennott has been hired as the vice-president in charge of operations.

Owing to continuing growth in Imperial's wetsuit sales, Aquanautics has commenced a construction project which will increase the company's production space from the existing 30,000 to 50,000 square feet, doubling its present production capabilities.

The "new" Imperial will be unveiled at this year's DEMA show.

OCEAN DYNAMICS PERSONNEL

Ocean Dynamics International recently made some personnel changes. Fred Koenig, formerly controller, has been appointed general manager. Noel Brown has assumed the duties of president from Robert Bludeau, who has taken the position of chairman.

PSYCHOLOGY/SCUBA WORKSHOPS

Mid-Continental Marine Corporation of Worthington, OH is now conducting one week and ten day workshops on psychology and scuba diving at various Caribbean locations. These are non-technical in nature, primarily offering a close group experience to certified divers. Trips are scheduled for March, June, November and December, 1982, and for March, 1983. Destinations include Grand Cayman, Bonaire, Tortola and Grand Turk. A typical format is two dives (or more) per day plus therapeutic group experience at the discretion of the participants.

The group leader is Rahe B. Corlis, Ph.D., a practicing clinical psychologist. Meetings are informal with emphasis placed on the scuba diving experience itself.

For more information, write to: Mid-Continental Marine Corporation, 6565 Worthington-Galena Road, Worthington, Ohio 43085.

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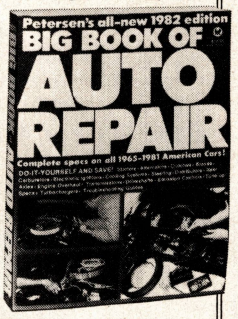

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_____Wrist
_____Forearm
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_____Ankle to Crotch
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Address
City State Zip

JBL/AMF

JBL Enterprises has bought the AMF Swimaster line of spearguns, knives, pole spears and related equipment. These products will be available in dive stores throughout the world.

For more information contact: Ron Pavelka, General Sales Manager, JBL Enterprises, Inc., 426-B W. Almond Ave., Orange, CA 92666; (714) 633-0860.

ABALONE LEASE

California Sea Farms, Inc., based in Santa Barbara, California has entered into a 25 year-plus bottom leasing arrangement with the State of California, Department of Fish and Game. This allows California Sea Farms to commence open-ocean planting and harvesting of hatchery-grown abalone on selected underwater reefs at San Miguel, Santa Cruz and San Nicholas islands.

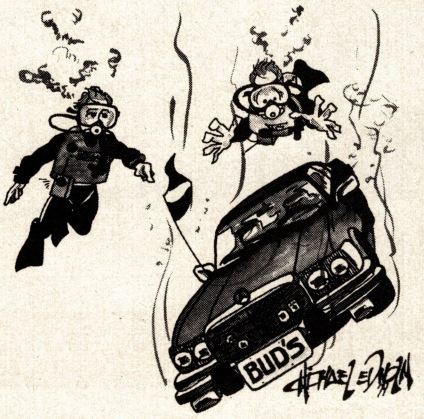
Win Swint, CSF President, stated that, "We see this re-seeding program as being absolutely vital to the continued existence of the abalone resource in Southern California . . ." Win is a well known pioneer of experimental open-ocean mariculture.

"While the Japanese have entirely rebuilt their abalone fisheries in this open-ocean mariculture fashion . . . CSF open-ocean operations will be the first of its type ever on a commercial basis in the United States," according to Lad Handelman, California Sea Farms chairman of the board. Lad is a founder of Oceaneering International and currently chairman of Cal Dive International.

For further information contact: California Sea Farms, Inc., Stearns Wharf 219-E, Santa Barbara, CA 93101.

RORABAUGH TO HARVEY'S

Claude Earl Rorabaugh has been appointed marketing director for Harvey's Skindiving Suits, Inc. of Kent, WA. Rorabaugh's background includes radio management with Bonneville Broadcast Consultants of Tenafly, NJ (WRFM New York) and he co-owned station KIRO in Seattle, WA.



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Not only do you get the time in crisp, clear liquid crystal digits, but the ladies' Watersport also includes an auto-calendar with month and date. And for $10.00 more, you get all that plus a 24 hour daily alarm for your hectic schedule. Both have super quartz accuracy to ± 15 seconds per month, 15 month battery life, and stainless steel case with resin band.

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Now, with this new Casio Watersport, you receive superior stopwatch capabilities. It times beyond the standard 60 minutes up to an amazing 12 hours with hairsplitting accuracy to 1/10th second. This sophisticated chronograph even records split/lap, time-out, and 1st-2nd place finishes. Plus has a daily alarm & hourly chime, ± 15 second quartz accuracy per month, a calendar, and 5 yr. battery. All include Casio's 1 year warranty, and our own 30 day guarantee, return within 30 days if not satisfied for a full refund.

Order Toll-free Today
Charge customers call toll-free 24 hours a day. Order #29 for ladies watersport without alarm, all black resin, only **$24.95.** Or for stainless steel versions with resin band #30 for **$29.95.** without alarm, with alarm, #31, only **$39.95.** Order #725 for men's Watersport in tough black resin case and band, only **$36.95.** Order #88 for men's Watersport with 1 hour chronograph & countdown timer instead of a 12 hour chronograph, in stainless steel case & resin band, only **$49.95.** Order #87 for men's Watersport with 1 hour chronograph & countdown timer instead of a 12 hour chronograph, in stainless steel case & bracelet, only **$54.95.**

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2 men shot dead

A 27-year-old Hawthorne man and an unidentified 61-year-old man, whose identity was being withheld, were sho and killed this we end in unrelated dents.

The
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was

They stole the woman's purse — and then her husband's life

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NOWN
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The story was ri
Charles Dickens' "Oli
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The locale was Santa M
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hes were burglaries—
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STATEMENT OF OWNERSHIP
MANAGEMENT AND CIRCULATION
(Required by 39 U.S.C. 3685.)

1. Title of Publication: SKIN DIVER.
2. Date of filing: September 22, 1981.
3. Frequency of issue: Monthly.
   A. Number of issues published annually: 12
   B. Annual subscription price: $11.94
4. Location of known office of publication: 8490 Sunset Blvd., Los Angeles, CA 90069.
5. Location of the headquarters or general business offices of the publishers: 8490 Sunset Blvd., Los Angeles, CA 90069.
6. Names and addresses of publisher, editor and managing editor:
   Publisher: Paul Tzimoulis, 8490 Sunset Blvd., Los Angeles, CA 90069.
   Editor: Bonnie Cardone, 8490 Sunset Blvd., Los Angeles, CA 90069.
   Managing Editor: Connie Johnson, 8490 Sunset Blvd., Los Angeles, CA 90069.
7. Owner: Petersen Publishing Company, 8490 Sunset Blvd., L.A., CA 90069; Robert E. Petersen, 8490 Sunset Blvd., L.A., CA 90069.
8. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities: None.
9. For completion by nonprofit organizations authorized to mail at special rates (Section 132.122, Postal Service Manual): Does not apply.
10. Extent and nature of circulation:

		Average No. Copies Each Issue During Preceding 12 Months	Actual Number of Copies of Single Issue Published Nearest to Filing Date
A.	Total no. copies printed	232,344	229,557
B.	Paid circulation:		
	1. Sales through dealers and carriers, street vendors and counter sales	30,742	33,001
	2. Mail subscriptions	156,027	155,885
C.	Total paid circulation	186,769	188,886
D.	Free distribution by mail, carrier or other means: Samples, complimentary, and other free copies	7,023	4,985
E.	Total distribution	193,792	193,871
F.	Copies not distributed:		
	1. Office use, left-over, unaccounted, spoiled after printing	5,588	4,866
	2. Returns from news agents	32,964	30,820
G.	Total	232,344	229,557

I certify that the statements made by me above are correct and complete.

Robert E. Petersen
Owner and Chairman of the Board

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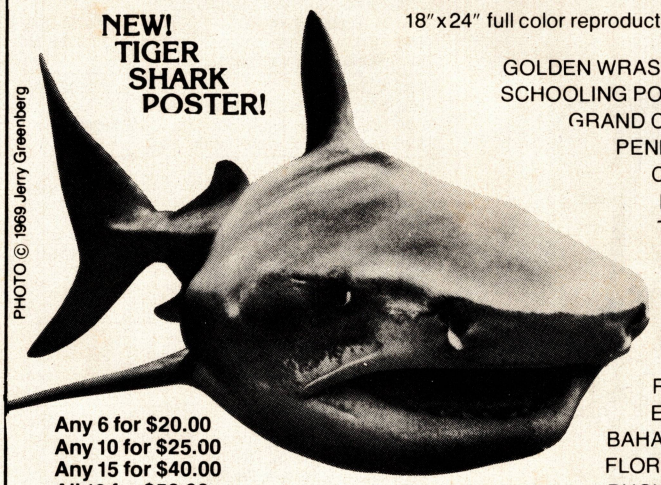

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3. After you complete an enjoyable dive trip, how many other people do you recommend the same trip to?
   A ☐ 1-3 B ☐ 4-8 C ☐ 9-12 D ☐ 13-18 E ☐ None
4. How do you usually pay for your overseas dive trips?
   1 ☐ Cash 4 ☐ Mastercard/charge 7 ☐ Other
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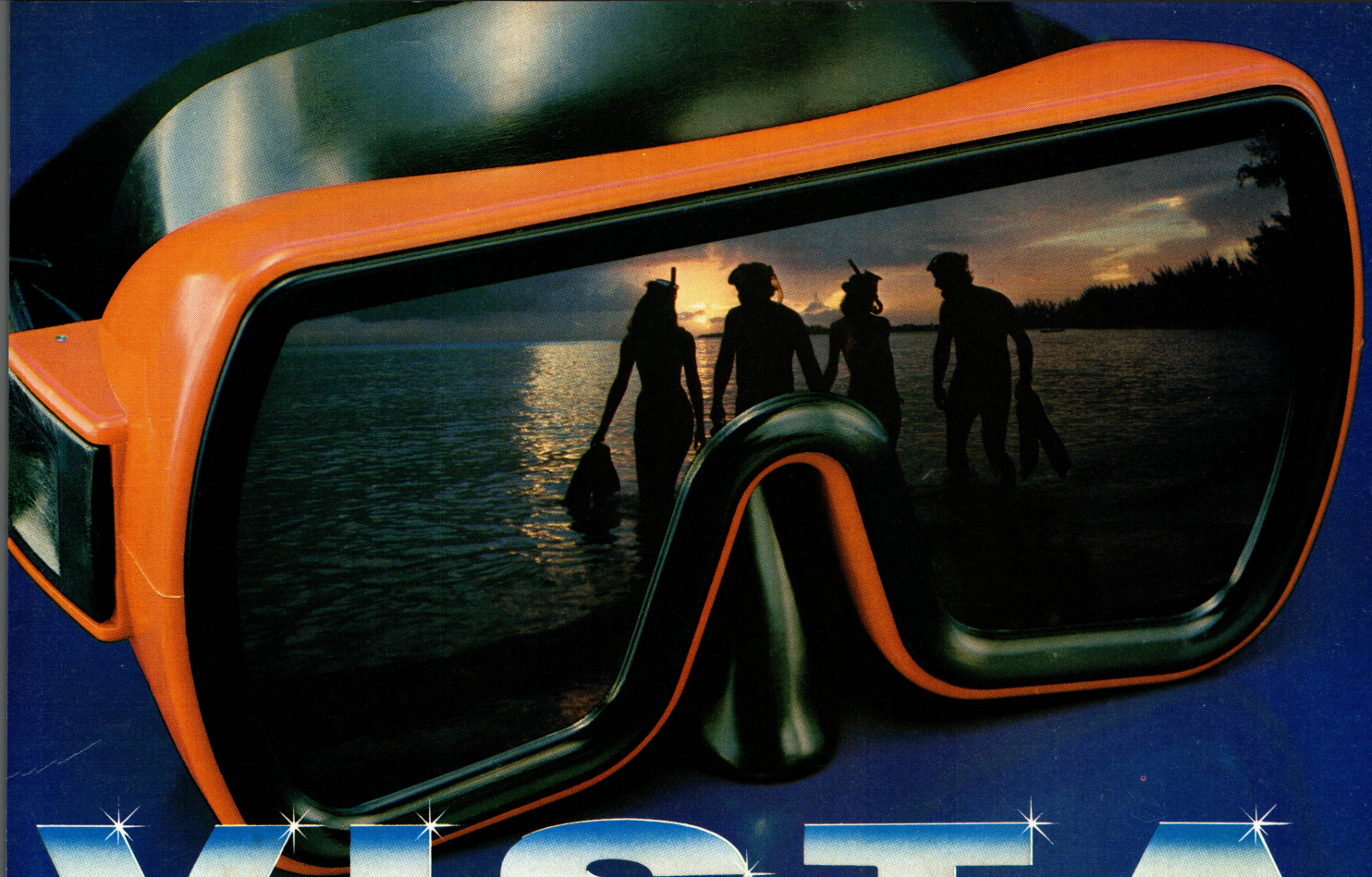

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